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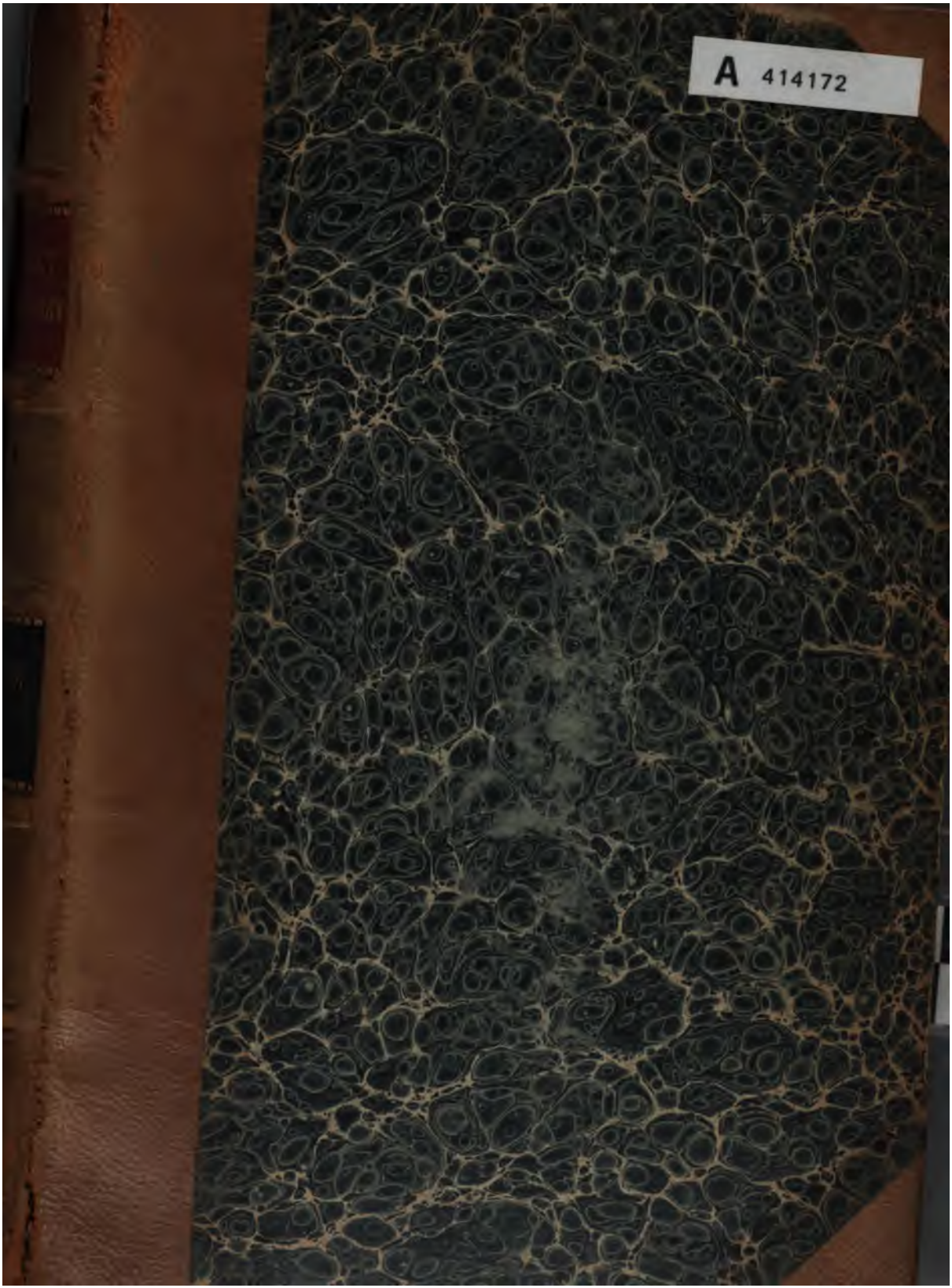
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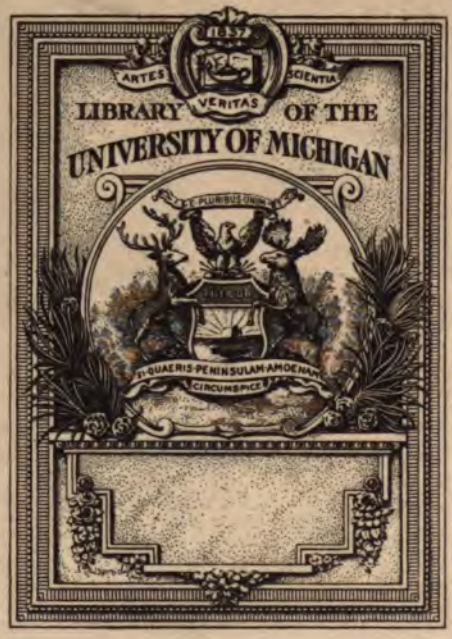
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THE

RETROSPECT

OF

PRACTICAL MEDICINE AND SURGERY,

BEING

A Half-Yearly Journal,

CONTAINING A RETROSPECTIVE VIEW OF EVERY DISCOVERY AND PRACTICAL IMPROVEMENT IN THE MEDICAL SCIENCES.

EDITED BY

W. BRAITHWAITE, M.D.,

LATE LECTURER ON MIDWIFERY AND THE DISEASES OF WOMEN AND CHILDREN AT THE LEEDS SCHOOL OF MEDICINE, ETC.,

AND

JAMES BRAITHWAITE, M.D., LOND.

PART LXII.....JANUARY.....1871.

UNIFORM AMERICAN EDITION.

NEW YORK:

PUBLISHED BY TOWNSEND & ADAMS.

1871.

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PRACTICAL MEDICINE.

DISEASES AFFECTING THE SYSTEM GENERALLY.

ART. 1.—THE ORGANIC GERM THEORY OF DISEASE.

By JABEZ HOGG, Esq.

[Organic germs are different from simple organic particles, and before discussing a question such as that which forms the subject of this article, it is necessary to distinguish in one's mind between these terms. This subject has been brought prominently into notice by the experiments of Professor Tyndall in a lecture recently delivered.]

It is not my intention on the present occasion to attempt a refutation of Professor Tyndall's method of demonstrating the presence of organic germs in the air, because, although he looks upon his experiments as exact, he thoroughly ignores the physiological aspect of the question, as well as those of a more palpable nature—such as the large amount of organic life, spores, &c., held in solution in all our potable waters, and that to these, among other causes, we had far better look for a solution of the difficulties which surround diseases of the class mentioned. The Professor's statements, in short, appear to me to be a series of bold assertions, wanting in exactness or put forth by a newly converted enthusiast, whose notion of dealing with facts is to square them with his own theories. I cannot believe that Professor Tyndall is ignorant of a series of valuable experiments made by Dr. Angus Smith, who, it is well known, has been long engaged in determining the relative condition of organic and other matters in the air of towns, and its probable effect upon the health of the inhabitants. This chemist and physicist has found that the chief cause of the insalubrity of the air of towns consists, not in "organic germs," but in the emanations from human beings too closely packed together, the presence of noxious gases generated by coal or thrown off by large manufactories. These tend to saturate the air with matters of the most injurious kind—as sulphuretted hydrogen, sulphuric and hydrochloric acids, ammonia, chlorides, and albuminoid matters—which are far more injurious to health and life than "organic germs." Dr. A. Smith therefore withholds his assent to anything like an "organic germ" theory, because he believes it has not been shown by its advocates to have any relation whatever to disease, and is likely to divert attention from causes far more important. Professor Wanklyn has also proved by his ammonia process that the total quantity of organic nitrogenous matter passing out of the lungs and held in solution in the form of watery vapour during the space of twenty-four hours in health amounts to about three grains. In disease it increases; but even in health the quantity of free ammonia varies considerably, and Dr. Ransome has ascertained that a larger quantity of organic matter is thrown off in Bright's disease and some others, while in catarrhs, measles, diphtheria, &c., a great deficiency takes place. This fact scarcely chimes in with the "organic germ" theorists, who have asserted that large quantities of albuminoid matters, vibrios, &c., are found in the air-passages in catarrhs. Then, with regard to the filtration of air through cotton wool, does this do

more than arrest the moisture given off from the lungs and saturated with ammonia and other salts? I believe not; it simply frees the expired air from all ammonia. The Professor's idea, however, is by no means new either to the chemist or physician. It is now several years since Professor Tomlinson, of King's College, showed how impossible it is to keep any vessel chemically clean, or even decently free from the dust floating about in a closed-up room. He found that corking up bottles did not prevent the entrance of particles of organic matter. After many trials to exclude the dirty atmosphere he tried cotton wool, and found by placing a pledget of this material quite loosely in the necks of bottles or glass tubes they remained perfectly clean for many days. Professor Tomlinson by employing flasks or bottles thus prepared was also enabled to delay the crystallisation of saturated solutions of salts to an almost indefinite period. He excluded in this way all particles of inorganic matter which at once form a nucleus of crystallisation, but such particles of matter are easily detected, and are certainly not to be confounded with "organic germs." The members of our profession have not lagged behind in a matter of this kind, but on the contrary have taken the initiative in the use of cotton wool inhalers for those engaged in deleterious manufactories, or in places where a large amount of organic or mineral matters are given off. Dr. Angus Smith in his report upon the air of mines, 1854, particularly dwells upon the danger to the health of the miner, produced by taking into the lungs through the open mouth of a large quantity of coal-dust and other matters. "If," he says, "as you approach the entrance of a pit, a gleam of sunlight happen to play across it, you will at once perceive an immense quantity of solid matters issuing forth in an endless stream. The impure air of the mine is loaded with these solid particles, which, when caught and submitted to microscopic examination, are found to consist of fine particles of coal, crystalline bodies, &c., and when issuing from iron mines, in addition to the fine metallic atoms, have the solid products from gunpowder explosions, arsenic in small quantities, and sulphides of various metals. With a given quantity of inspired air the miner takes into his lungs from sixty to eighty grains of such impurities each day, so that it will be readily understood that such dust and dirt must in a very short time exert a very injurious effect upon the lungs and other organs of the body." To prevent the entrance of such matters into the mouth and lungs Dr. Smith proposed the use of a simple respirator, made of a layer of cotton wool, placed between wire gauze, which could be made for a few pence. But it would be an idle waste of time to dwell upon anything so palpable, and which bears no proportion to the ordinary condition of the atmosphere. There is another point I must say a word upon: it is the physiological part of the question which, as I have already said, has been entirely ignored in this discussion. Professor Tyndall has failed to notice the important fact that the respiratory tract is well taken care of, being freely supplied with cilia and ciliated epithelium, which remain in action, sleeping or waking; by their agency a sort of churning process is carried on amply sufficient not only to arrest the further progress of any foreign body, but probably to kill "organic germs," and effectually prevent their germination in any of the internal organs. Or when particles of matter enter in large quantities, have we not additional means provided for their expulsion, in the act of either coughing or sneezing? Much of even coal-dust inhaled collects in the throat, there becomes entangled in the mucous secretion, and is ultimately expelled by expectoration. I therefore very much doubt whether the change observed by Professor Tyndall, when he exhaled through cotton wool, was due to the cause he ascribed it to—namely, filtration of the air from organic germs; it was undoubtedly due, as I have before said, to a retention of moisture, carbonic acid, &c., which under ordinary circumstances is thrown off from the lungs; at all events the conditions of saturation would be so materially changed by the interposition of cotton wool, and so arrest the salts of ammonia and sodium chloride, held in solution, that a different luminous cloud would certainly result. Indeed he seems

to feel this difficulty, for he says, "that the condensation of the aqueous vapour of the breath is shown by the formation of a luminous white cloud of delicate texture. It is necessary to abolish this cloud, and this may be done by drying the breath previous to its entering the beam."

Towards the close of forcible expiration the breath would be drier and freer from moisture as well as the salts of ammonia and other salts usually given off, and this should be taken into account. But would it be possible to judge in this way, when all organic germs were filtered out of the air? Are there not some so minute that they cannot be filtered out? We shall presently see.

Those who know little of the microscope and the perfection to which the modern instrument has attained believe that organic germs such as Tyndall spoke of in his cloud of dust cannot be seen by its aid, nor appreciated in any way, except by watching their play across the path of a ray of solar or electric light. This is not the fact; it has long been a practice with microscopists to expose glass slides in suspected places or atmospheres, and, in a very short time, a large crop of various minute particles are deposited. If I take an ordinary slip of glass, and smear it over with glycerine, and expose it for a moderate space of time either in my room or in the open air, I find, when examined under the microscope, a quantity of small particles deposited thereon, such as articles employed and in domestic use at the moment of exposure would throw off, chiefly consisting of mineral and vegetable substances—as fragments of coal, granite, brought in on the dress or shoes from the street, vegetable hairs, cotton, as well as wool fibres detached from the clothing; these are often mixed with a few starch granules from the bread, and occasionally a few spores of fungi. In the house the latter form but an inappreciable proportion, while in the open air we often take a good deal, and during the warm damp weather, peculiar to some periods of the year, a larger quantity of fungus spores and particles of vegetable hairs will be deposited on the slides. If I expose a glass slip over a sewer, I sometimes obtain a variety of spores, circular, ovoid, and jointed, or dissepimented, and mixed with ammonia nitrate, which chrystallises out after the glass has stood by for a few days. By employing a more scientific method as an aspirator, which draws in a larger quantity of air in a given time, Pasteur and others collected the same kind of substances. If I put a small quantity of distilled water into the bottle before the air is drawn through by the aspirator, I also get, in the course of a few days, some of the lower forms of animal life developed in the fluid. This experiment, as you know, seems to prove the spontaneous generation theory, heterogenesis, of animal life.

The microscope has clearly demonstrated the nature of these various substances floating in the air, and it is more than probable that a few escape detection, either from their extreme minuteness or transparency; but those who have investigated the subject will agree with me that it by no means follows that the air is filled with organic particles, or contains more than a very small proportion of "organic germs." Dr. Angus Smith determined the relative proportion of organic matter in pure air to be 1 grain in 200,000 cubic inches, while the most impure air of towns contains often as much as 1 grain in 8,000 or 10,000 cubic inches of air. For weeks together, at particular periods, organic germs, as the spores of fungi, will be almost absent, or, at all events, they are so extremely difficult to trap that we fancy them absent. Some twelve years ago, when I was engaged with my friend, Mr. Hunt, in an investigation of the so-called fungoid diseases of the skin, in a very large proportion of the cases I discovered evidences of sporules and mycelium of fungi. During a later investigation conducted about two years afterwards, I noticed a remarkable absence of anything approaching to fungus spores. A very few cases were discovered, most of which were old, one a persistent case of favus, which had, for a long time, been under treatment. I know not what explanation to offer of such a fact, except that there appeared to be a change in the type of diseases under treatment at the *time*; probably, due to the state of the atmos-

phere. Every step in such an inquiry is often surrounded by the same incomprehensible difficulties. We can no more understand these floating germs than we can how the perfume of a flower is diffused through the air, or how a grain of musk should give off its peculiar odour for the space of twenty years, and not become perceptibly diminished in bulk. We are equally unable to explain why out of twenty persons breathing a loathsome air one will breathe a fatal dose, and nineteen escape the malarious poison. I must confess I do not believe that if the twenty were breathing through cotton wool filters the relative conditions of health and disease would have been in any way disturbed. Aristotle found no difficulty in believing, and inducing others to believe with him, that worms and insects were generated by dead bodies, and it was only towards the end of the seventeenth century Redi succeeded in demolishing this theory, and proving that worms and insects which appear in decaying bodies are produced from the ova deposited there by the mature parent. It was, however, thought to be altogether preposterous to suppose that putrefaction could produce an insect (neither could it), and this explanation was at the time utterly rejected as fallacious. Driven from the insect world where such an hypothesis could have no chance of success, the disciples of Aristotle sought refuge in the world of fungoid life, or "organic germs." But here we arrive at an immense gulf, which requires to be bridged over before we come to the portal of truth. I have no doubt that the hypothesis of the production of disease by "organic germs" first obtained credence simply because we know of something analogous occurring in the flight of insect life, and the propagation of swarms which inflict blight on vegetable life. To associate such a phenomenon with the occurrence of disease in animal bodies is most unreasonable and unsatisfactory. From an "organic germ" to a "specific germ" theory seems to be a natural transition, and certainly the most plausible affiliation of a disease with the "specific germ" theory is cholera; but even here we find opinions becoming more and more divided. With those who have given time and attention to the subject, it is quite a matter of uncertainty whether the infection is conveyed in the air, held in solution, in the potable waters, or taken in with the food, such as rice, the staple commodity of the native population of India, which is sometimes attacked by a fungus. If we assign a specific germ theory to cholera, we have to deal with a migrating malaria, a wandering cause of disease not confined to hospital, house, or district, capable of being diffused through the atmosphere and conveyed along vast tracts, affecting different places with a varying intensity, which no known conditions of earth or atmosphere will explain; but nevertheless possessing the power of reproducing itself, so as to spread the disorder by fresh creations of the original conditions which produced it. Microscopical and chemical examination of the atmosphere of the wards of Hospitals in which large numbers of cholera patients have been treated, has afforded no reliable solution of the question. Mr. Rainey and Dr. Thomson, in 1855, made every attempt to isolate the supposed cholera contagium in the wards of St. Thomas's during the epidemic visitation of that period, but without success. They only discovered particles of vegetable hairs, coal dust, epidermic scales, starch, with occasionally a few spores of fungi; but the results obtained were thought to be unsatisfactory, nor did there appear any grounds for the belief that these organic germs had anything to do, directly or indirectly, with the prevailing disease. The remarkable coincidence of the prevalence of "rusts" and other fungi, noticed by many observers during the first outbreak of rinderpest, led many to suppose that this disease was due to the spores of fungi; but this opinion was soon exploded.

Dr. Tytler, I believe, first attempted to connect cholera with diseased food, during an epidemic visitation at Jessore, in 1817. He asserted that it was occasioned by the consumption of unsound rice. But when, in 1833, he exhibited his specimens to the Medical Society of London, they proved to be "ergoted rice." Now, although rice infected with ergot has been *known to produce* fearful results, the symptoms of poisoning, as you are

aware, differ widely from those of cholera. In 1861 a gentleman lost six horses in a very sudden and suspicious manner. His belief was that they had been poisoned, and the veterinary surgeon agreed in this; but upon making a careful post-mortem he could find no trace of poison. The food was then examined, and some oats attracted attention. My friend, Professor Tuson, received a supply, and sent me some for examination. I noticed that the grains were matted together in lumps, by a sort of cobweb-like material. Upon breaking them up a blackish-looking powder was deposited on the paper; placing some of this under the miroscope, "bunt" and other spores were detected, and I was able to help in clearing up the mystery, and confirm the suspicion, that death was due to a cumulative poison swallowed in large doses in food, which starved, instead of nourshing the animals. Numerous well attested instances of a similiar kind might be given if it were necessary, but it would be merely a reiteration of a well known fact, that toad-stools are poisonous, and mushrooms edible and nourishing.—*Medical Times and Gazette, June* 18, 1870, *p.* 659.

2.—ON THE LOCAL AND SPONTANEOUS ORIGIN OF ENTERIC FEVER.

By Dr. CHARLES E. PRIOR, Bedford.

[Hardly any subject is more interesting than that of the origin of typhoid fever and few more important. Such exanthemata as scarlatina and variola, undoubtedly originate in contagion alone. On the other hand, whilst typhoid fever is certainly in most cases originated by contagion, it is probable that it does in some originate spontaneously.

Some febrile diseases are of spontaneous origin—of local origin. Granted. What are those diseases? Have they any peculiar characteristics? Do they differ in any way from the exanthemata? They have; they do so differ. Intermittent and remittent fevers form a group by themselves: their origin in malaria is unquestionable. The non-connexion of that malaria with foul odours or organic refuse has been repeatedly demonstrated. It has been found in its most deadly form on the barren sands of the Tagus, or the Rock of Gibraltar; in the stony ravines of India, where scarcely a blade of grass can grow, or a trace of organic matter exists. I have myself met with it in the elevated valleys of the Malvern range. It is the specific gravity of malaria alone that indicates its existence; to chemistry, to smell or to vision it is alike unknown.

It is the characteristic of the fever of ague and of the paludal form of yellow fever to be incommunicable by contagion, nor have they any typical eruption; in fact, their non-contagion would appear to be almost a law of nature for the preservation of our species. Were it otherwise, in the words of Dr. Bancroft, "every dunghill, every collection of decaying animal or vegetable matter, might become the source of a fresh contagious and pestilential disease, and mankind, surrounded by such accumulated perils, would soon cease to exist.

Never having seen a case of yellow fever, or resided in a hot climate, I speak with diffidence on the subject. It would appear, however, that there exists in tropical latitudes a certain specific form of the disease, communicated by contagion and continuous in type. If this be so, it may eventually turn out to be a disease having the same relation to the paludal disorder that our own enteric fever bears to ague. Possibly, with further research a typical eruption may be discovered. Be this as it may, the grand fact remains, that in England at least, and probably in other countries, the intermittent fevers of local or paludal origin are non-contagious and non-eruptive.

It would be begging the question to say that the converse of this is true—namely, that eruptive contagious fevers are not of local origin; but this much may be granted—(1) that they are not of paludal origin; and (2), a point which I have discussed with some minuteness, that enteric fever is beyond all question a contagious disease.

"Typhoid fever," says Piedvacke (p. 124), "reigns everywhere—in the dwelling of the rich as in that of the poor, in places low and damp as in places high and dry, in town as in country." Again: "Pathological observation teaches us that the affections which are the product of external and well-demonstrated causes are but very rarely, perhaps never, contagious. A simple enumeration would be sufficient to prove it." (p. 17.) Again: "Some local epidemics have appeared produced by emanations disengaged from vegetable and animal matters in putrefaction. But it is easy to demonstrate that the most part are independent of this cause. Hygiene has hitherto made little progress in the country. One often finds there dunghills before the doors, and stinking water; dirt reigns in a great number of rural habitations. But typhoid fever is not in conformity with these circumstances; one sees it in houses rendered, by position and arrangement, most salubrious; in high places as in low, in town as in country." (p. 22.)

To this the experience of M. Gaultier de Claubry, in his report to the Academy (1848-49) on the epidemics of France, corresponds, and the testimony is of great value, as it comprises the experience of 162 communes in 28 departments, and of 122 separate reports on nearly 10,000 cases. "Relatively to the conditions of topography," says he, "the situation of places has thrown no light on the causes of the disease. A similar remark is applicable to the state of salubrity or of insalubrity of the villages where the disease has shown itself, as also to the variable degree of ease or misery of the population who inhabit them. Singular as such an assertion appears, it is the rigorous expression of the numerous facts contained in the report.

There yet remains for consideration two branches of the argument—namely, the argument from experiment, and the argument from experience.

Experiment.—The late Dr. Barker, of Bedford, endeavored, by exposing animals for shorter or longer periods to cesspool air in a box constructed for the purpose, to ascertain the connexion between the gaseous products of fæcal fermentation and certain febrile diseases. Four dogs and a mouse were thus exposed. In all the dogs diarrhœa and vomiting, more or less severe, set in; but all the animals, with the exception of the mouse, recovered. Beyond the symptoms named, there was no reason to suppose that the disorder produced was any stage of enteric fever.

Other observers and the same gentleman also have exposed animals to various gases, the products of decomposition—namely, sulphuretted hydrogen, carbonic acid, ammonia, and sulphide of ammonium.

Fifteen experiments on sulphuretted hydrogen are recorded by Dr. Barker and by Dr. Richardson, performed on dogs, hedgehogs, and birds. In most of the cases accelerated respiration, jactitation of the muscles, tremors, insalivation, and disorder of the bowels appear to have ensued, passing, if the experiments were pushed further, into narcotism, coma, and death. Careful post-mortem examinations were made in several of the cases, but in none was the characteristic intestinal lesion of enteric fever discovered.

Of the well-known effects of carbonic acid it is unnecessary to speak.

Dr. Barker also made eleven experiments on sulphide of ammonium introduced into the box containing the animals (dogs, jackdaws, and hedgehogs). General distress, lachrymation, diarrhœa, and salivation were the principal symptoms produced. Two dogs and one bird were poisoned, and their bodies were examined after death. There was nothing in the post-mortem appearances characteristic of enteric fever.

It appears to me that there is one grave deficiency which vitiates all these experiments. It is this: we have no evidence that any of these animals are susceptible of typhus or of enteric fever. In fact, I never heard of any domestic animal that had contracted the disease, unless it be the pig; and surely, if the local origin of enteric fever be not a myth, the condition of piggy's existence ought to be causing daily victims.

The only animal in whom enteric fever can be studied is man. To *experiment upon* the human species is out of the question; and therefore

it only remains for us to select from the records we possess those histories of the exposure of a healthy population to the products of decomposition supposed to be most capable of generating enteric fever, which, from their scale and circumstances, realize most fully the conditions of an experiment. Such a history is that of the removal of the Cimetière des Innocens at Paris in 1785—a space of two acres, which contained the remains of at least half a million of bodies in various stages of decomposition, yet which was carried out during two years without the slightest accident or any appearance of epidemic disease among the workmen. Such again is the great stink—if I may so term it—of 1858, when the Thames became in such a revolting condition as led to the enormous works of the metropolitan main drainage; yet, according to the testimony of Dr. M'William and others, the health of the police employed on the river, and of the population along its banks, was absolutely unimpaired, and no epidemic ensued. Such, too, is the history of the horrible Montfaucon, whose vile odors arising from the bodies and refuse of thousands of dead horses, dogs, and cats, and from large pools of excrement collected from the entire city of Paris, were perceptible at two miles' distance, and were absolutely insupportable on the spot to the uninitiated; and yet, according to the testimony of Parent du Chatelet, the workmen employed there enjoyed the most robust health, and their families have shown no peculiar tendency to enteric fever. Besides observations of this magnitude, a few experiments upon animals with poisonous gases sink into insignificance.

It has been conjectured that sulphide of ammonium may be the peculiar deleterious agent which produces enteric fever. But nothing in the way of proof exists: no animal which has been exposed to the vapor has shown the usual symptoms of the disease after the ordinary period of incubation. In fact, I think myself justified in saying that the experimental proof of the spontaneous origin of enteric fever utterly breaks down.

Experience.—The last appeal lies to that most fallacious of all tests, "experience."

Many cases from many authorities have been cited in illustration of the spontaneous generation of enteric fever from fæcal fermentation, vegetable decomposition, and foul odors of all sorts. The late Dr. Barker collected thirty-six cases of the sort; but the diseases are not well discriminated. In fact, I believe that in many of the cases they are not correctly described, some of them having been gathered from non-professional sources; the history of some others is, to my own knowledge, incorrectly stated; and some are from professional men who were apparently unaware of the distinguishing characteristics of typhus and enteric fever. Many of them also are far too short, but, on the whole, there appears reasonable ground to suppose that about one-half of the number were cases of enteric, or, as it is termed, "typhoid" fever.

To Dr. Murchison, as the great apostle of pythogenesis, and one who has thereby, according to Dr. Aitken, "rashly committed science to an hypothesis of a highly doubtful nature" (p. 413), one naturally turns for the best evidence that can be produced in support of his dogma. Dr. Murchison has collected 13 cases, which are set forth with considerable detail. Of course it is out of my power to quote them in a paper of this sort. They include the Croydon and Windsor epidemics, the Clapham School case, the Westminster epidemic, alluded to by Dr. Watson, and others equally singular.

Many of these outbreaks may be accounted for on the explanation of Dr. Budd—namely, the transmission by the sewers of the poison from intestinal discharges. Some of them, such as the "Westminster fever," have been a matter of question as to whether they were fever at all. There still, however, remains a puzzling residuum. But then, on the other hand, we must consider the forcible facts brought forward by Dr. Chisholm, Dr. Hughes Bennett and others, and briefly alluded to in this paper, in proof of the non-origin of enteric fever from simple fæcal fermentation. It is fair also to state that the experience of Piedvacke gives a certain proportion

of cases in which the disease could not be traced to contagion, and appeared of spontaneous origin, children in the cradle being in two or three instances the first to be attacked, and the disease spreading from them. "In the country I noticed, out of 312 cases, 12 typhoid fevers at least where I acquired certainty that there was no anterior connexion, direct, or indirect, with other patients; and they have been the stem from which sprung a great number of others." (p. 127, 128.) Piedvacke, however, does not name any peculiar connexion between these cases and defective cleanliness; on the contrary, he expressly denies such an origin.

Such is a brief review of the case from experience. It appears to me that there are certain considerations of which gentlemen who favour us with their observations are too prone to lose sight. Has the explanation of Dr. Budd been sufficiently considered, and has its applicability to the case in question been tested? Is it the rule, I would ask, or is it the exception, even in diseases of the most markedly contagious nature, to obtain an explanation of the origin of the disease? When is it so obtained in a case of scarlatina? How often in typhus, or even in small-pox? Yet what medical man for that reason doubts either their transmissibility or their transmission? The fact is that these diseases are always in existence around us, but their method of diffusion is far too subtle to be traced under all circumstances.

For a hundred and twenty years this country had remained exempt from rinderpest, sanitary defects nowithstanding; and again now it is verging towards extinction. Yet every now and then see how the cases crop up: one in Windsor, after seven months' intermission; others in Derbyshire, after an interval nearly as long; another in Wales, or it maybe even in Ireland. But do we therefore assume the spontaneous generation of rinderpest?

It is one of the laws of nature that animals and plants which propagate by continuous succession should appear in alternating periods of profusion or scarceness. The deeper the knowledge of the naturalist, the more instances will occur to him. The wasp—nay, the very birds are subject to this law.

Whence came the humming-bird moths which appeared in such remarkable numbers in the summer and autumn of 1866?—whence the clouds of locusts or of gnats?

But when we descend to the lower forms of life observation is fairly baffled. Their rapid growth, their minute spores, their subtle powers of penetration, their mysterious disappearance and equally mysterious return, their wonderful migrations, are such as the present powers of man are totally incapable to follow—scarcely even his philosophy to comprehend.

At this point I think it fair to leave the present subject. From what I have had the pleasure of laying before you, the following conclusions occur to me with more or less of distinctness. That some of them have not been worked out as they should be, is due partly to the limited time at my disposal; partly, it may be, to an inadequate rendering of what presents itself, nevertheless, forcibly to my mind.

1. Spontaneous generation of plants and animals is a figment which is constantly receding as means of observation extend and improve.
2. Spontaneous generation of parasitical diseases is a figment.
3. The exanthemata may be a low form of fungoid life.
4. Small-pox,a contagious exanthem, is proved by indisputable negative testimony to be incapable of spontaneous generation.
5. Several other contagious exanthemata cannot originate spontaneously.
6. Enteric fever is a contagious exanthem.
7. Febrile diseases of local origin are not contagious.
8. Experiment gives strong evidence against the spontaneous origin of enteric fever.
9. Observation, as usually conducted, is a treacherous and insufficient test of the origin of febrile diseases.—*Lancet, Sept* 3, 1870, *p* 327.

3.—ON THE PROPAGATION OF CHOLERA AND ENTERIC FEVER.

By Professor MAX VON POTTENKOFER.

[It is Professor Pottenkofer's opinion that we must seek elsewhere than in impure drinking water, contaminated with excrement, for the local causes of fever and cholera. How little this can be the cause, may be shown from the following quotation from the treatise of Buxbaum on the typhus in the barracks at Neustift in Friesing.]

"I have practised about ten years in a neighbourhood in which the drinking-water must have been under all circumstances very impure, without my being able to prove it by analysis. It is the neighbourhood of Eichstadt, in which in consequence of its geological situation there is the greatest scarcity of water. This is particularly the case on the ridge of hills situated north of Eichstadt. Here, as in the whole of that region, the formation is the white Jura limestone, which extends as an undulating table-land, having neither brook nor stream. For as the arable soil lies more or less immediately on limestone, either stratified lime, or dolomite, or calcareous rock, the atmospheric precipitations disappear without leaving any traces through the numberless clefts in the depths of this limestone, coming again to light at a more or less distant valley as permanent or periodical springs. One sees in the field or wood of this plateau numerous funnel-like caverns, which gather at a considerable depth all the rain-water collected from its neighborhood, and convey it bubbling to the bottom. There are therefore in this region not only no streams or brooks but also no wells. Frequently the drifted clay had formed an impermeable stratum in some trough [among the hills]. Here and there are found wells containing water to the depth of a few feet, generally in private possession, and closed by a lock to preserve its small quantity of water for the possessor or privileged persons. With the exception of these cases all the inhabitants must obtain their water by collecting the rain-water into cisterns by means of gutters.

"In a history of the town and district of Eichstadt by the district school inspector, the Rev. Mr. Hotte, of Wachenzell, it is said on this subject (p. 128): 'The inhabitants are allotted the rain-water in the gutters, which is named sparrow-water (*spatzenwasser*), because the sparrows also make free to drink from the gutters. However, this water is, when, as occasionally happens, salt or ashes are thrown into the cisterns, tasteful, and certainly more salubrious than others containing saltpetre or sulphur or iron.'"

It will be seen that the author here gives the opinion of the inhabitants of the place, who consider the sparrow-water more healthy than that from more common sources. For as they have long observed that they are not exposed to so many diseases as their neighbours, they have believed that they derive health from their cisterns with as much propriety as those who descry the elements of disease in their drinking-water.

"That this sparrow-water cannot be deficient in organic material may be taken for granted without analysis; for rain-water collected from gutters into shallow cisterns, and often stored up there for a long time in dry summer or cold winter months, must indeed become rich in organic matters. It, in fact, generally swarms with all sorts of little animals, even visibly to the naked eye, and must for this reason frequently have salts and ashes mixed with it to diminish the excess of organic life. And yet there probably is scarcely a region more exempt from all the so-called infectious diseases than that high range. During a ten years' practice there, I have, besides catarrhal affections, rheumatism, and inflammatory diseases, observed no acute illnesses, nor any cases of typhus. The intermittent fever, which in the years 1856–59 very frequently visited the inhabitants of Altmühlthal, I have never seen in that plateau. But the most remarkable example of the innocuousness of drinking-water rich in organic matters is the so-called black water, which in the district in question is

given to the cattle, particularly to the horned cattle, in order to save the sparrow-water for the use of the men. This *schwartzwasser* is obtained by collecting in one or more of the lower places of the village the rain-water which streams in all directions from the roads, dunghills, and the like. Here in this artificial black lake ducks and geese and swine sport themselves, and the animals come to drink. Professors Drs. Holzner and Lindner were kind enough to submit to microscopical and chemical investigation some of the water, and the result is annexed to my report. I obtained the sample from the district school inspector in Wachenzell, the Rev. Mr. Hotte, who sent me by letter as follows :—

"The black water reservoir of this place (Wachenzell) lies almost in the centre of the village, in a large natural excavation called a lake, which is supplied by rain water. As all the dung heaps lie there free and exposed, so not only does a heavy rain carry with it the liquid manure into the lake, but the same flows there almost constantly till the weather becomes too dry, whence the lake obtains the colour and quality seen in the accompanying samples. I observe that at this moment, and at times of very long drought, the water is much thicker than that sent. Now from this lake the horned cattle drink daily, and ducks and geese swim, and the horses are washed there ; consequently, the smaller the influx in dry weather, the richer the contents, the blacker the water.

"The horned cattle, which were accustomed only to clear water, when they come here objected at first to the black water, but gradually come rather to prefer it to the rain-water of the wells. Lately only the horses drank it (the clean water), but they too in the scarcity of water contented themselves with the lake water. All the animals which drink this water are healthy; nay, the farmers go so far as to affirm that this water is more wholesome for them than the rain-water. Nothing is known here or in the neighbourhood of diseases of animals. And yet this same black water is here the general drink for animals over the whole of our mountains, from Schernfeld to Enkering, as well as on mount Irfersdorf, from Kipfenberg to Beilngries. For the summits of the hills mentioned have no spring-water, they are supplied only from gutters, and the so-called lake is in every village the general water reservoir. A farmer in Tornhüll had one immediately between his stall and dung heap ; all his animals drank therefrom, and they always enjoyed the best health. When I stated to some farmers that I would send some of the water away for examination because it was not thought by scientific chemists to be harmless, they answered only by a contemptuous smile, as if there could be any doubt about a matter which appeared to them self-evident." "This communication of the Rev. Mr. Hotte I can confirm after many years' experience. I have observed with astonishment this foul water and the strong horned cattle which sipped so contentedly the fluid, which was regarded by the inhabitants as strengthening broth. I can remember seeing in Souversholtz, at a prosperous farmer's, a well near the dung heap, which appeared to me by its position and the fluid it contained designed as a proper receptacle for liquid sewerage. Knowing the general neglect of the liquid manure by the farmers there, I was very much astonished, and expressed to the owner my approval of his being a praiseworthy exception, and collecting his liquid manure for the field. He at first did not understand me, but on taking my meaning he assured me with the usual cunning smile that this supposed liquid manure was worth more to him as a drink for his cattle.

"If we observe now the results of microscopic and chemical examination of these waters and the quantity of organic matter which they contain, and consider also the fact that certainly this water has already been used for hundreds of years by the animals dwelling in that district, and that these animals are thereby not only not diseased, but, on the contrary, enjoy an exceptionally good health, we can hardly any longer accept the hitherto *received* opinion that a drinking-water which contains in one litre 80-100 *milligrammes of organic* matter must necessarily be pernicious to men."

Professor Dr. Lindner has examined this black water, a sample of which Dr. Buxbaum sent to Freising, and found :

"This water was of a brownish colour, and rapidly passing into green ; it was completely opaque. Its odour was stinking from sewerage, its reaction alkaline. On evaporation it gave the peculiar odour of cow's urine. The greater part of the sediment was of an organic nature.

1 litre of water gave 1.165 gramme of sediment,
of which 0.285 " was inorganic,
0.880 " organic.

Professor Dr. Holzner remarks on the microscopic examination of the black water:—"The dark brown bodies are partly made up of colouring matter, partly putrefying substances, partly of different kinds of diatoms of the genus Navicula, the green grains of single-celled Algæ, or colonies of cells, all containing chlorophyll enveloped in a general pear-shaped membrane. The black bodies are spores, the brittle epispores of which are granulated and black coloured. Besides the vegetable bodies, one finds a comparatively large number of infusoria and wheel animalcules. The mixture of both organic and inorganic matter is enormous in comparison with that contained in the dirtiest well water.

There are, then, places where, with the worst drinking-water, there is at the same time immunity from epidemic diseases, and therefore, however often bad drinking-water and epidemic disease coincide, the conclusion that there is a casual connection between them does not of necessity follow, for the effect can in all cases proceed just as well directly from the soil as from the water.

By this I do not mean to say that we should now drink black water, or that we might drink it unharmed ; on the contrary, we know the purer water to be better, and I am convinced that both men and animals on the Jura plateau at Eichstadt would be much more healthy and stronger if they, in addition to their soil, which is so unfavorable to the *materies morbi* of certain zymotic diseases, they had also good drinking-water. But I venture to bring forward these most remarkable facts, the truth of which I can gurantee, to show that a drinking-water, notwithstanding its demonstrably containing dung-water (*mistjauche*) is still incapable of engendering certain epidemics or of favoring their spread. The germs of epidemics and epizootics are certainly often conveyed from the valley of the Danube and Alt Mühl river to the heights of the Jura plateau, but, as experience shows, have never been able to strike root there, although the drinking-water both of men and animals was surely sufficiently contaminated with decomposing organic matters. The horned cattle, in particular, drink a water in which all the refuse from the surfaces of the filthy villages are mingled together in one common pool. These facts appear to me of a nature to lead etiological investigation away from false tracks into the right path.

The drinking-water theory appears to me at present in a transition stage, which will result in a perfectly natural manner in its passage over into the soil-and-ground-water theory. The drinking-water theory cannot do without the soil, with which men come in contact essentially in two ways—through the water and through the air of the soil. It was quite natural that our attention should be first turned to that which is most perceptible to our senses—viz., the water which we can see, feel, and taste—and that we should leave unnoticed the air which we cannot directly by our senses detect in the soil, although it makes up more than a third of the volume of a dry porous earth which is able to sustain the heaviest building, and from diffusion, variation of temperature, and the mechanical movements of the whole atmosphere, it must be in a state of continual motion, though this may be not sufficient to blow out a light or carry the hat off one's head. It has assuredly been by a great error or a great oversight that one has always hitherto imagined that the air ceases and another element—earth—begins at the ground on which we firmly tread, when the soil is more pervaded by air than water, and the air in it is much more free to move than the water.

We know now, from the observations and inquiries of distinguished philosophers, that the air is able to support and carry along particles and organic germs of extreme fineness in comparatively great multitudes, which give rise to fermentation, putrefaction, and other processes, according as they find a suitable substratum. Might not the air in its passage through different strata of earth bear with it and bring to the surface that which may be able to derange our health?

Our dwellings stand as hollow bodies on the ground, as we place a glass bell over a volatile substance of which we would prevent the extension to the atmosphere. The air-circulation in a house is more insignificant than in the open air, so that all emanations from the soil become more collected and concentrated in the air of a house. We live in the air above the soil, and the greatest part of our lives is spent in dwelling-houses, and we probably use a disproportionately larger quantity of air than water. An adult breathes in twenty-four hours something over 8000 litres of air. The weight of this amounts to about 10,320 grammes, or more than 20 lbs., whilst we take during a day at most 2 to 3 litres, *i.e.*, 4 to 6 lbs. of water. If, therefore, hurtful matters become mingled in the least degree with the air, they come proportionally in much greater mass in contact with our organism ; not, indeed, merely in the lungs, but also over the mucous membranes of the first portions of the air-passages which serve also as food-passages, amounting quantitatively to even more than if we drank freely of a contaminated water. In my opinion, we are supplied with undoubted facts not as to the drinking-water, but the soil itself. We must study the organic processes in the soil, and seek to find what it at different times and under different circumstances gives up to the air. Almost everything in this direction is enveloped in an obscurity which no ray of scientific light has yet penetrated. I only claim for myself the credit of having collected and established facts which necessitated inquiry in this direction, and finally pointed it directly to the soil.

In such inquiries, to find new aspects and methods is now more useful than to think how a theory, no longer tenable, can perhaps be still upheld.—*Medical Times and Gazette, June* 25, 1870, *p.* 685.

4.—ON THE TREATMENT OF SCARLATINA.

By W. C. Williamson, Esq., F. R. S., Professor of Natural History in Owen's College, Manchester.

About the period when my attention was first directed specially to this subject, the treatment of scarlatina by ammonia was attracting notice. The success which was said to have attended the adoption of this plan suggested to my mind the possibility of preventing the lowering of the vital energies by the free and bold administration of stimulants from the very commencement of the attack, instead of waiting until symptoms of depression began to manifest themselves ; and believing that it was the stimulating properties of the remedy, and not any imaginary power it possessed in rendering the blood more fluid, that made ammonia useful, I determined to try the effects of champagne, which I did in the next case of scarlatina that fell into my hand, which was at the commencement of 1859 ; the result was most satisfactory. Since that time I have attended a very large number of such cases, yet I have rarely given a dose of medicine of any kind during the last ten years. The moment I became satisfied that the case was one of scarlatina, I have administered the champagne regularly and freely. The more severe the febrile symptoms, being convinced that they resulted from an atonic rather than an opposite state, the more bold has been my administration of the stimulant, and these symptoms have always diminished in violence instead of being increased by the treatment. The rash has come out more freely ; I have not had one solitary example of diseases of the ear, or of malignant sore throat; but one of unconsciousness, with a typhoid condition ; and also bnt one solitary instance of nephritic dropsy. The *last case only* confirmed my views. The young child of a professional man

was seized with the fever, but the attack was very much masked in its early stage. Three days elapsed before I could satisfy myself that the case was really one of scarlatina; and I believe that the loss of these three days, during which champagne was not administered, had much to do with a *slight* attack of dropsy with albuminuria, which followed in about three weeks. Of course I do not believe in universal remedies of any kind, but I am convinced that in the disease under consideration, the true plan of treatment is to save the patients from the stage of depression instead of trusting to our power of lifting them out of it at a later period. One of the latest cases which I attended illustrated the possibility of doing this in a remarkable manner. A fine boy, seven years of age, was attacked very smartly in March, 1869. Within forty-eight hours after I first saw him his lips had become dry and brown, his tongue being the same. Sordes gathered about his teeth, and his throat was rapidly assuming an alarming condition, both as regards its appearance and his inability to swallow; but during that interval the child had taken two full-sized bottles of the best champagne, and in the forty-eight subsequent hours he drank two more. The result was that all the typhoid symptons disappeared as rapidly as they arose, and in the evening of the fourth day the child was sitting up in bed merrily rejoicing over a basinful of boiled milk. I have not the slightest doubt that any delay in the administration of the stimulant would, in this case, have been fatal. The suddenness with which the formidable symptoms sprang up, and the rapidity with which they progressed during the first two days, were most significant of a serious result. They passed away again more rapidly than they arose.

Two points alone have I found requiring to be watched in connection with this plan. These are the possibility of sickness and of diarrhœa. Occasionally I have found it necessary to suspend the champagne for a few hours, falling back during the interval upon old port wine, but such cases have been rare. The fact that a young child of seven or eight years of age can take an entire bottle of champagne within twenty-four hours, not only without intoxication but without any signs of excitement, is, in itself, significant of the atonic condition of the nervous system and of the necessity for upholding it *from the beginning*.

In addition to this plan of treatment I believe it difficult to exaggerate the importance of caution in the after treatment. After the first week I gradually diminish the stimulant, but rigorously enforce confinement to bed during the first three weeks, and to one room for three more. During the present spring I have seen the first case of a death occurring in spite of this treatment. It was that of a boy who had been delicate from infancy, and in whom some low muttering delirium set in on the second day; yet even here the power of the stimulant was exhibited. Early in the morning of the fourth day I was summoned to him, and found him apparently dying. For some hours previously the nurse had very improperly relaxed the administration of champagne; I immediately resumed it, and the constant rally was most remarkable, again giving me hopes of a favorable result, but the boy sank early on the seventh day.—*Manchester Medical and Surgical Reports, October*, 1870, *p.* 61.

5.—SCARLET FEVER SUCCESSFULLY TREATED BY AMMONIA AND MILK.

By Dr. R. Sweeting, Stratford.

The object of this communication is to give to the profession the results of a number of cases treated by ammonia and milk. During the last four months I have had under my care upwards of sixty cases; the ages varying from eight months to forty years; the disease also varying from the mildest to the most malignant form. Out of these sixty cases there were only eight deaths; of these eight, the age of the eldest did not exceed five years, the majority were under three years, and in not one case did dropsy occur. My mode of treatment is as follows:—On my first seeing the patient I give

a powder of five grains of calomel with ten grains of mercury-with-chalk at bed time, and a tablespoonful of castor oil on the following morning, thereby clearing the bowels at the onset; after which, the following mixture is administered: aromatic spirit of ammonia, three drachms; potassio-tartrate of soda, one drachm; compound tincture of lavender, one drachm; water to an ounce and a half: one teaspoonful every hour in cases from three to six years of age; under three years the dose should be one-half; if above six years, the same recipe should be put to six ounces of water, and a tablespoonful given every two or three hours. When the patient is old enough to use a gargle, I find the following very successful: dilute sulphuric acid with compound tincture of lavender; to be used every four hours. To infants or very young children, who cannot use the gargle, I give the concentrated mixture, that it may stimulate the fauces—thus acting in the place of a gargle. From the commencement of the disease I give undiluted sweetened milk *ad libitum*, and find that the patients do well under this unstimulating diet, without losing flesh; and, what is encouraging, the little ones never refuse it, but will take it readily, while they refuse everything else.

I have noticed various methods of external treatment recommended in the public journals; and one given by Dr. Walter Fergus, in the Lancet of the 20th November, 1869, should in my opinion be avoided. He states as follows:—"The external treatment is of great importance. Rapid sponging with vinegar and water is called for if the patient does not sleep, or if there is much irritation of the skin. In cases of extreme development of the rash and burning skin, the cold douche rapidly given acts like a charm: the patient, placed in a sponging bath close to the bed, has four or five washhand basins of cold water poured in quick succession over him, is quickly rubbed dry and put to bed, when, if the treatment has done good, he drops off to sleep almost at once." Now, in every case that I have known, in which cold or warm sponging with water, or vinegar and water, has been resorted to, the patient has either died in the acute stage, or dropsy has supervened; and in one particular case I know of, the scarlet rash appeared at night, the child was ordered to be put in a warm bath at once, a few hours afterwards coma came on, and within sixty hours from the commencement of the attack the child died.

It is proper to remark that, after the first purgation with calomel and castor oil, I give a dose of castor oil every other night. It is astonishing to find how clogged and offensive the fæces become; it would seem as if the whole system was in a state of putrefaction. By expelling the morbid matter from the bowels at intervals of forty-eight hours a better tone is given to the circulation, and the milk then acts like a charm.

Should the cervical glands become swollen, a warm linseed poultice is used constantly until the swelling disappears. Should suppuration take place, I allow them to burst of themselves, and never lance them; if they are lanced, the discharge continues for a long time, exhausting the patient. During the whole period of the disease I allow the hands and face *only* to be wiped with the end of a towel dipped in warm water.

I hold that it is the duty of each individual member of the profession to communicate the results of his practice in any branch of his calling, especially when such results tend to alleviate the ills of life, or in any way conduce to its preservation. We are often deterred from thus recording our experience by the fear of seeming egotistical; so that our literature often merges into magnificent writing, or into that sort of learned profundity that would dissect an oyster, but never humble itself to compare the results of different modes of treatment. Our studies are of use only as they make us more capable of relieving human sufferings. *Homines medicina non eloquentia curantur.—Lancet, June* 11, 1870, *p.* 834.

6.—ON THE USE OF BROMIDE OF POTASSIUM AND AMMONIUM IN CASES OF CONTINUED FEVER.

COMPLICATED WITH SLEEPLESSNESS, CONVULSIONS, AND OTHER CEREBRO-SPINAL SYMPTOMS.

By Dr. William Moore, King's Professor of the Practice of Medicine, Physician to Sir P. Dun's Hospital, Dublin.

During my recent period of duty at Sir P. Dun's Hospital twenty-one cases of continued fever came under my care, exclusive of measles, scarlatina, and acute rheumatism. Of these twenty-one cases, five were typhus, of which one proved fatal, the remaining sixteen were "enteric."

The first case I shall detail which was carefully reported by Mr. W. R. White, resident medical scholar, was that of Mr. C., admitted into the Pay-ward on the 4th of November, 1869, with well-marked typhus, about seven days in fever. He had great agitans and subsultus, especially when spoken to; the eyes were red and suffused; the pupils rather contracted; much delirium, he was ordered 8 ozs. of wine with beef tea.

On the 5th, he was in a very excited state, not having slept the previous night, constantly trying to get out of bed.

On the 6th, he was very delirious, he had not slept, and he succeeded during the day in getting out of bed and running about the ward. His wine was increased to twelve ounces.

On the 7th, he was much in the same state, had no sleep, great agitans, and hyperæsthesia when spoken to and touched, continually trying to get out of bed. Ordered a drachm of the tincture of hyosciamus in an ounce of camphor mixture at bed-time.

On the 8th, he did not seem to know any one, and kept picking the bed clothes. The hyosciamus seemed to have quieted him during the night, although he did not sleep. Ordered fifteen grains of bromide of potassium in an ounce of camphor mixture to be given him at nine p.m.

9th. The patient got several hours sleep during the night, and was conscious; the "floccitatio" has disappeared, the agitans and injected state of the eyes were much less; he did not remember a single incident since his admission. From this date his convalescense was established, and he left the hospital on the 20th November.

Case 2 (reported by Mr. Richard Lloyd, "Resident Medical Soholar,") was that of Mrs. Elizabeth C., aged 30, housekeeper, who was admitted into Sir P. Dun's Hospital on the 13th Nov., 1869, labouring under typhus fever of about eight days' duration. On the 14th she was maculated; dusky; eyes ferretty; teeth and lips covered with sordes; restless, sleepless, and delirious; with "floccitatio," and involuntary passing of fæces and urine; altogether, a most unpromising case. She was ordered a table-spoonful of whiskey in cold water, every hour, and beef-tea, the head to be sponged, and fifteen grains of the bromide of potassium in an ounce of camphor mixture, to be given at bed-time.

15. Much in the same state, whiskey increased to a tablespoonful every half-hour, and the bromide of potassium to be given at bed-time.

16. She had a quiet night, slept at intervals, continue the same treatment, bromide of potassium to be repeated at bed-time.

17. Patient in a more favourable condition, had a quiet night, still passing under her, but in other respects improved. Same treatment with bromide of potassium.

18th. Patient slept several hours during the night. She was quite conscious from this date, the stimulants were diminshed, and the bromide of potassium omitted, and she left the hospital after a tardy convalescence on the 19th. December.

Case 3 (reported by Mr. White).—James T., aged 27, plumber, was admitted into Sir P. Dun's Hospital on the 16th of December last with well marked typhus.

On the 17th, he was delirious, and had not slept; the eyes were injected, and the pupils rather contracted; his pulse was 120; temperature 103.9,

respiration 30; he was ordered twelve ounces of wine with beef tea during the twenty-four hours, and to get twenty grains of the bromide of ammonium in an ounce of camphor mixture at bed-time.

On the 18th, he was not quite so restless and had a quiet night. Same therapeutical treatment continued, twenty grains of the bromide of ammonium at bed-time. This draught was repeated for four consecutive nights; the patient had a good recovery, and left the hospital on the 7th January.

Case 4.—This patient was admitted with all the symptoms of "enteric" fever. He had the rose-coloured spots; cæcal gurgling with tympany and diarrhœa; when comparatively late in the fever cerebro-spinal symptoms manifested themselves. The details of the case which were carefully watched and reported by Mr. Reuben Hervey, resident medical scholar in Sir P. Dun's Hospital, are as follows:—

Peter O'C., aged 18, a compositor in the office of the *Evening Post*, was admitted into Sir P. Dun's Hospital on the morning of the 14th December last. He had all the symptoms of "enteric" fever, and as far as we could gather, the day of his admission into hospital, was the eleventh of his fever. He had been a healthy young man, with no tendency to epilepsy or nervous disease; his pupils were somewhat dilated; his eyes clear; he was tender over the ilio-cæcal region; slightly tympanitic, and had diarrhœa. Numerous rose spots were visible over the abdomen and chest. His temperature was 103.6. Pulse 116; respiration 20. He was inclined to sleep, and for several days seemed to be getting on favourably, and the diarrhœa ceased. Ordered eight ounces of wine.

On Saturday the 18th, the bowels were twice very freely moved, but he presented no other symptom calculated to cause any special anxiety. On Saturday night, about half-past ten o'clock, Mr. Hervey noticed the patient lying on his back, low down in the bed, with his arms folded over his chest; his breathing was rapid and irregular, a circumstance which Mr. Hervey had noticed during the afternoon, and had found no chest complication to account for. When spoken to he made no reply, nor did he stir, but when he turned on his side he spoke a few words and swallowed some whiskey in milk; a blister was applied to the nape of the neck. About three o'clock on Sunday morning he was unable to swallow, and his respiration was still more hurried, and there was a good deal of agitans and subsultus present, with nasal stertor, injected eyes, and contracted pupils. He moved his eyes with great rapidity, would swallow nothing, and lay with his head retracted, The head was shaved and a blister was applied over the vertex; he now seemed insensible to all appliances, his feet and hands were hot.

He remained in this anæsthetic state till ten a.m. on Sunday, when he opened his eyes, took a drink, and regained his consciousness so far as to speak to the nurse and some friends, still he had involuntary passing of fæces and urine. It was impossible to obtain a sample of urine for the purpose of examination. The blister over the vertex was dressed with ung. hydrarg. To get twelve ounces of wine and four of whiskey.

About six p. m. on Sunday, he suddenly relapsed into the same unconscious state attended with opisthotonos. He now got twenty grains of the bromide of ammonium in a draught, which he tried to reject; he passed a better night, but on Monday morning he had a series of convulsive attacks which lasted over four hours, these were succeeded by diarrhœa and copious flow of urine, all of which were passed involuntarily. On Monday night the twenty grains of the bromide of ammonium were repeated, also on Tuesday night, during both of which days he had occasional intervals of consciousness. On Wednesday, owing to a return of the fit, he got twenty grains of the bromide at 11 a. m. and at 4 p. m. and that night he had some quiet sleep. On Thursday he again relapsed, and could not answer any questions, but was able to swallow; the bromide (twenty grains) was now given three times a day, and that night he had a little sleep. On Friday he made an effort to answer questions if very much pressed, but still passed under him. At this stage, with difficulty, a sample of his urine was obtained, its

sp. gravity was 1021, and it contained no albumen. The bromide of ammonium was continued three times a day. He slept the greater part of Friday night, on Saturday he could answer any questions he was asked; took greedily what was given to him, and ceased to pass under him. On Sunday the bromide of ammonium was discontinued, all cerebro-spinal symptoms disappeared, and he had a favourable and comparatively speedy convalescence.

The maximum temperature in this case was 103·7; maximum of pulse 120; of respiration 48.—*Medical Press and Circular, May* 4, 1870, *p.* 345.

7.—THE USE OF BROMIDE OF POTASSIUM IN AGUE.

Cases under the care of Dr. Moxon, at Guy's Hospital.

It is known that bromide of potassium was first introduced into medical practice, as a remedy for enlargement of the spleen, by Dr. Williams. Reference to the cases which are given in full in his Practice of Medicine does not, however, show any relation of the remedy to ague-poison more especially than other causes of enlarged spleen. It was as a spleen-remedy, and not as an ague remedy, that it was found useful. During the last four months, trial has been made at Guy's Hospital, among the out-patients, of the use of bromide of potassium in ague. The results are such as to show that this drug possesses a very remarkable power over ague, and a power that promises to be of important use in many of the more obstinate cases. Dr. Moxon has had several instances of its successful use; and two of these were in persons who had taken quinine for a length of time without benefit. The following is a short note of one of these cases.

J. P., aged 27, a joiner, had been laid up for two months with tertian ague. It presented this peculiarity, that at the onset it continued its course for a fortnight, and since that time had alternated weekly; so that he shivered every third day in one week, and was free from shivering the next, and so on—a week of ague following a week of rest. His spleen was three inches below the false ribs in the mammary line. He had the look of ague, but had not lost much flesh. He took quinine nearly from the first constantly, but did not get any better. He came to Guy's Hospital as an out-patient under Dr. Moxon on January 10th, and then commenced taking scruple doses of the bromide of potassium thrice daily. On the 17th, he said he had had no shaking the previous week, though it was the week when he ought to have shaken; but he had had some headache. The dose was increased to half a drachm three times a day. He never had a fit after taking the bromide; and on the 24th of January his spleen had gone up, so that it was only one inch below the ribs. He remained under treatment until February 28th. On presenting himself then, he said that he had had no more ague fits; he felt bodily stronger and better than when he first came, and his spleen was scarcely to be detected by the fingers. The so-called "bromism" had not been produced in him. His fauces and conjunctivæ were sensitive as those of other people.

The other patient had applied on the same day as this man, and had given a very similar account of herself, *i. e.*, ague for many weeks, and continual use of quinine without benefit. The bromide was prescribed; and, after attending once and reporting benefit, she ceased her attendance on the following week.

The following case shows still more strikingly the usefulness of the remedy:—

J. S., aged 19, a gardener, from Streatham, came under Dr. Rees's care with tertian ague on June 13, 1869. He stated that he had had paroxysms of ague every third day, between four and five in the afternoon, for the last two months; and had taken quinine during the whole of that time, but had derived no benefit or relief of any kind therefrom, and consequently sought relief at this institution. On admission, he had the general appearance of

a healthy lad, but complained of tenderness in both hypochondriac regions. There was extended dulness over the liver, and also over the spleen. On the following day, he was ordered two grains of quinine in infusion of gentian three times a day. On the 14th he had another paroxysm. On the 20th, the dulness over the liver and spleen was more extended; and on the 27th it was noted that no benefit had arisen from the quinine. He was accordingly ordered twenty grains of bromide of potassium in infusion of gentian three times a day. On June 30th, he was noted to have been free from attacks since the 27th, and felt better. On July 3d, the splenic dulness was diminished, and he felt well. On July 7th, he was discharged well. During this patient's stay in hospital, he had taken eighty-four grains of quinine without benefit; but, after the first drachm of bromide of potassium, he pronounced himself materially relieved.

A considerable number of other more recent cases have been treated in the same way; and this has been the general result—that the bromide always checks the ague, so that for one or two weeks the patients have no seizures; that in some of the cases the cure is permanent, even while the patients still continue to reside in the place where they took the ague; but that in many cases, when the patient is still in the ague-district, the ague-fits return after one or two weeks of free interval.

Thus it appears that the bromide of potassium is a remedy well worth a trial in cases of ague that do not yield to quinine, or in cases where the patient has left the place where he was seized with the poison; but it is not pretended that, for the general cure of ague, it would compete in advantages with quinine. Dr. Moxon took the suggestion of its use from Mr. Walter Buchanan, a student of Guy's Hospital, to whom all credit for the notion is due. It certainly appears that a new and important service of the bromide is here shown; and it is interesting to compare this result with the power which iodine and iodide of potassium have shown in curing ague, as reported in Virchow's Archiv, xlix.—*Brit. Med. Journal, June* 11, 1870, *p.* 602.

8.—THE INFLUENCE OF MILK IN THE PROPAGATION OF CONTAGIOUS DISEASES.

By Lawson Tait, Esq., Birmingham.

In the month of April last I was engaged with my friend Mr. M. E. Naylor, veterinary surgeon, in examining the conditions attending the spread of the foot-and-mouth disease in the West Riding; and, amongst other stations of suffering, we visited the farm attached to the West Riding Lunatic Asylum, under the superintendence of my distinguished friend Dr. Crichton Browne. I had a long conversation with the intelligent farm-bailiff, Mr. Turner; and amongst other experiences, I tasted the diseased milk. I found that this had a peculiarly disagreeable smoky taste, and at first I rashly set this down as due to the disease of the cows. I found, however, that this smoky taint was by no means confined to the milk yielded by the affected animals; and Dr. Browne told me that he had sometimes occasion to send away milk and cream from his table, which was unfit to use on account of this smoky taste. A little examination further showed us that this flavoring was due to the recent asphalting which had been done in and near the milk-house. It at once flashed across my mind that, if milk acquired this tarry flavour from the absorption of the exhalations of asphalting it was just possible that it might also acquire other things which were not so innoxious; and I at once set going a series of experiments which have led me to the belief that milk is an extremely dangerous agent for the spread of contagion. I need not say that I did not try any experiments, as they were all personal, with contagious matter; but by enclosing fresh milk under bell-jars with tar, turpentine, assafœtida, fæces, urine, etc., I found that in most instances *the milk* became impregnated with the smell, and sometimes with that

intensely disagreeable sensation which we know as the "taste like the smell" of the substances employed. The degree to which this was acquired seemed not so much to be in proportion to the amount employed either of milk or of infectant substance, but to the amount and quality of the cream which rose to the surface of the milk; the oleaginous molecules seeming to act as the menstruum of contagion. This is not unlikely, when we remember that the best solvent for nearly all odoriferous principles is oil. Clinically, this question will be most difficult and dangerous to work out. For one, I shall not attempt it. But, if we bethink ourselves of any instances of disease which might in certain instances be communicated by milk, typhoid fever stands out with fearful probability. Enteric fever is nowhere more common nor more fatal than in country farmhouses, where means for the removal of the objections are not sufficiently well adapted for security, and much too convenient for safety. Endemics of typhoid fever break out in towns, limited sometimes to a house or particular family, in such way as to defy any explanation by deficiencies of drainage or water-supply. I am certain that I have seen cases that might bear the explanation of milk-poisoning, although I have not had the opportunity of working out the facts—facts which, even if worked out, might be capable of other explanations. The question is a difficult one, but worthy of consideration; and the letter in the *Times* of Thursday last, describing the possibility of the spread of the contagion of scarlet fever by means of milk, strengthens the view I am inclined to hold—that such communication is rather common.—*British Medical Journal, Sept.* 24, *p.* 344.

9.—THE TREATMENT OF BLEEDING CANCER BY CHLORIDE OF ZINC PASTE.

By C. F. Maunder, Esq., Surgeon to the London Hospital.

[The treatment so successfully adopted in the following case appears to be most suitable when the tumor cannot be taken clean away by the knife, nor by any other means, yet in which the discharge from an open sore, is, with the inevitable pain, gradually wearing out the patient's strength].

Mrs. ——, 40 years of age, extremely stout, but of good general health, first noticed a lump under the left breast about two years ago, when removal was advised by Mr. Samuel. She was then lost sight of by him until Christmas, 1869, when the disease had progressed, and become deeply adherent. In February, 1870, ulceration and bleeding had set in, and continued to increase up to the time of my visiting her. In the middle of April I saw her in consultation with Mr. Samuel of Mansell Street. With the exception of a somewhat care-worn expression of countenance, Mrs. —— had the appearance of a person in perfect health. On examination, she was the subject of an open sore about three inches in diameter, having thickened indurated everted edges, and a firm, solid, thick base, about an inch thick. The greater part of the area of this sore and induration was below and to the inner side of the left breast, but encroached upon, running up under and into it, as it were, for a short way. On removing the dressing, blood flowed freely, and the odour was very offensive. On each occasion of dressing the wound bled very freely, causing great alarm to the patient and her friends, who were sometimes unable to arrest the hemorrhage without Mr. Samuel's aid. Removal by the knife was impossible, by reason of the relative position and fixed state of the growth, and I determined to endeavour to prevent periodical hemorrhages by destroying the surface of the ulcer, and keep it in abeyance with chloride of zinc paste.

The first dressing consisted in the application of a piece of zinc paste to the surface of the sore below the breast, and on the forcible introduction of one or two "points" of the same material, hardened, into the indurated

portion of the adjacent mammary gland. Then came cotton-wool to absorb any possible discharge; a piece of antiseptic carbolic plaster, a compress of lint, and a bandage to retain these in position. The last and fourth application by me of the paste was made on April 27th, two days having been allowed to elapse between each. At each dressing a substance composed of paste and cancer-tissue was picked away, and the depth of the diseased growth had been lessened. After the second and third application the patient experienced a good deal of pain. It was now agreed to wait the result of treatment, and to repeat the use of the chloride only in case of recurrent hemorrhage.

I have not seen the case since, but to-day (June 17) the husband of Mrs. —— informed me that Mr. Samuel has not made any further use of the paste, nor has hemorrhage, which was previously constant, recurred, after the lapse even of so long a time as more than seven weeks. Neither has the disease progressed, but the swelling about the sore is smaller, a large slough having come away.

To-day (June 19th) Mr. Samuel tells me that "Mrs. —— has greatly improved in health, being able to sleep well, eat well, and taking moderate exercise. The sore is now granulating healthily, discharging normal pus free from smell, and contracting rapidly—indeed, there is every prospect of ultimate closure of the wound, and that soon. There has been no recurrent hemorrhage whatever; whereas formerly bleeding occurred at odd times, necessitating his being called up at night sometimes to arrest it. The good effect of the treatment upon the patient's mental and bodily health can scarcely be exaggerated, and he is both astonished and gratified by the result."

This method of treatment is of course not novel, but its applicability to certain cases has scarcely received the attention which it merits; and I am therefore the more anxious to draw the attention of the Profession to it because two seniors had just previously seen the case, and had not suggested a remedy. This is not the only instance in which I have used chloride of zinc for a similar purpose.

Had the antiseptic carbolic plaster anything to do with the good result of the treatment? does it tend to check cancer-cell growth? It has been used up to within the last week.—*Med. Times and Gazette, July* 16, 1870, *p.* 61.

10.—SUNSTROKE AND ITS THEORY.

By Dr. Ely Van de Warker, Syracuse, New York.

[Dr. Van de Warker, after an interesting notice of the literature of the subject, relates four typical cases from those which came under his notice during the American war. The symptoms may be grouped in three stages. The first attended by loss of appetite, headache, and general feeling of languor. There is often among the earlier symptoms, exhaustion of nervous energy, swollen face, and faltering of the tongue. The seizure, or second stage, comes on suddenly with coma, irregular and convulsive breathing from engorged lungs, sometimes general convulsions. The skin is generally dry and hot, the face flushed, and the temperature raised to over 104° Fahr. The third stage, which consists of collapse, generally closes the scene.]

The physician is very seldom called to attend the patient in the first stage. In 60 cases in New York Hospital, 44 were insensible at time of admission, 16 were either stupid or sensible. The pupils were dilated in 30, contracted in 19, and natural in 11. The respiration was hurried in 44. Pulse uniformly quick, varying from 100 to 160 or more per minute. Convulsions were present in 24 (Swift). Dr. Repper reports 20 cases, 3 of which resulted in insanity, a very rare termination. In 33 fatal cases the *pupil was co*ntracted in 20, moderately dilated in 7, markedly so in 6. No

cases are reported of recovery where the pupils were contracted. Mr. Longman notices a frequent desire to micturate as a very constant symptom, and places great emphasis upon it, believing, should it prove to be an invariable symptom, that it may become valuable to the surgeon as an indication of approaching danger. In India, where insolation attains a more defined expression, the premonitory phenomena assume more prominence. They generally are weariness, debility, and prostration, nausea, vertigo, and incontinence of urine. On the march in the ravines of northern Bundelcund, described by Dr. Barclay, no one was attacked by insolation who had not previously exhibited the symptoms. These symptoms are to insolation what the premonitory diarrhœa is to cholera. Barclay says, when the disease is fully expressed the pupil is always contracted—to the size of a pin often—the face invariably pale; the skin harsh, *dry*, and burning to the touch, far *beyond the doctor's experience in any other disease*. Frothy mucus, clear or of a brownish colour, was in most instances ejected from the mouth and nostrils before death. Face often ghastly from the beginning of the attack. Dr. Simpson, of her Majesty's Seventy-first Regiment, gives a very graphic review of the symptoms of sunstroke occurring in that command. An intensely hot, dry skin, *lasting even after death*, in those who died within twelve or sixteen hours, and a feeling of weight just below the ensiform cartilage. Involuntary weeping or laughter. A tumultuous action of the heart, and beating of the carotids. "Loud moaning during the stage of coma was almost invariably present"—a symptom distinguishing it from the coma of apoplexy. There was a great desire to sleep, which passed rapidly into a state of insensibility. In many instances attempts at deglutition brought on convulsions of an epileptic character, and in others genuine epileptic convulsions, lasting from five to fifteen minutes, also mania and hysteria.—(*Braithwaite*, vol. xl., p. 301.)

What renders morbid insolation almost Protean in its extensive list of symptoms is the fact that the heat devotes its morbid influence to one organ or set of organs, to the exclusion of other viscera. In some cases we have a predominance of lung-symptoms; in others the brain is the organ affected, constituting a true heat-apoplexy; while in others the spinal cord and great nerve-centres are the principal seat of morbid action.

Theory of Sunstroke.—A careful study of the phenomena of insolation must lead the reader to but one opinion, that insolation is the expression of the presence of a morbid degree of heat in the organism. It is now my purpose to account for the presence and retention of this morbid heat. An opinion held by many of our army surgeons was, that it results from a drainage of the serum of the blood by excessive perspiration. Common causes must to a certain extent produce common pathological effects; but in this case we see the phenomena of insolation clearly isolated from that attending the colliquative sudation of phthisis, or the vast fluid evacuations of cholera; cases in which the fluid evacuations are obtained at the direct expense of the serum of the blood. There must be some other morbid force at work. Yet we briefly recapitulate the predisposing causes: Any depressing influence; continued fatigue; bad air or food; intemperate habits; febrile condition or plethora; highly electrical or malarious condition of the air, and a thermometric condition of the atmosphere of from 95° to 120° F. During our march from Savannah to Hawkinsville, Ga., the men did not suffer from insolation until the fourth day of the march, when the entire command was prostrated from exertion and the excessive heat. In Dr. Barclay's experience the men suffered a gradual deterioration of health. There are, therefore, two conditions which are indispensable prerequisites to an attack: 1. General depression of the vital forces from whatever cause; and, 2. A temperature of from 95° to 120°. One of the first effects of these conditions is an arrest or impairment of function. This is preeminently the case of the cutaneous secretion. Dr. Simpson observed: "Every man seized with sunstroke, and who could answer questions, informed me that he had not perspired for a greater or less extent of time—sometimes not for days—previous to being attacked, and that he enjoyed

good health so long as he perspired, but that on the perspiration being checked he felt dull and listless, and unable to take much exertion without making a great effort."

This suppression of the cutaneous secretion was always accompanied by a rise in the temperature of the body; often as high as 112° (Dowler), and, according to Dr. Levick, 104° to 111°. This is a constant precursor of an attack, so much so, that the absence of perspiration is regarded by Indian surgeons as a warning of danger (Morehead). By a study of the more pronounced form of insolation we see two constant conditions: 1. An arrest of cutaneous function; and, 2. A rise in the temperature of the body unparalleled in any other form of disease. The first manifestation of the diseased condition is the arrest of the function of the skin; the second condition is in the increase of temperature. These conditions stand in the relation of cause and effect, as I will shortly prove. We see in other forms of diseased action the same effects produced. In intermittent, in typhoid, or malarial fever, or in acute pneumonia, suppression of the perspiration leads to a rise in the thermal condition of the body, and a restoration of the function of the skin by either the action of remedies or by a spontaneous amendment of the disease, is followed by a corresponding depression of temperature. In intermittent fever this phenomenon is constant, independent of any remedial measures, the result of a law of Nature, that the febrile stage of the attack closes spontaneously in profuse sudation and a consequent abatement of systemic heat. In insolation the arrest of the perspiration is but another in the series of cause and effect. A man with the action of all the vital functions unimpaired is not liable to insolation. The many causes enumerated before, all tend to lessen or suppress function; this is not only seen in the arrested cutaneous secretions, but in the constipation, and in some cases the suppression of urine, and the engorged condition of the liver, spleen, and other important glands. There is, therefore, a complete chain of morbid acts: 1. The preliminary state of exhaustion and depression; 2. The resulting impairment of function; 3. The retention in the system of a morbid degree of heat, resulting in 4. Insolation.

This constitutes the morbid acts of insolation in the order of their occurrence. In this view of the disease I am considering the case in its typical form. From the multitude of symptoms that characterize sunstroke, these leading phenomena can always be clearly isolated.

The integrity of the cutaneous function is essential to the maintenance of the equilibrium of the thermal condition of the body. The perspiration is one of the principal avenues of escape for the surplus heat generated by the operations of organic life. While this is true of the body when in a quiescent state, it becomes a cardinal truth when the body is in a state of exertion and exposed to an elevated temperature. The healthy man, when exposed to these conditions, at once perspires, and the temperature of the system is preserved at a normal standard. If this means of compensation between the systemic heat and that of the surrounding air is impaired, heat must accumulate in the system in reciprocal proportion. To use a familiar illustration, the evaporation of perspiration from the surface of the body lowers its temperature in the same manner as the evaporation of water from the surface of heated iron.

When the body is exposed to intense solar heat, the perspiration is the direct antagonist of the sun's rays. When we reflect upon the amount of heat necessary to evaporate one ounce of water, it is easy to see how the arrest of this function may lead to serious or fatal lesion of the vital fluids or nerve-centres. An ounce of water passing from the fluid to the vaporous state receives as much heat as would raise its temperature to 990° Fahr.; or, the quantity of heat required to convert a quantity of water into vapour is five and a half times as much as will raise it from the freezing to the boiling point. The evaporation from the surface of the body of one ounce of perspiration would transmit from the system to the surrounding *air all the heat* required to accomplish its evaporation. On the contrary,

the arrest of this secretion would lead to the retention in the system of the heat otherwise expended in the conversion of it from the fluid to the vaporous state. The other excretory functions being impaired, it would obviously require but a short exposure to an elevated temperature to lead to an accumulation of a morbid degree of heat. This is not an immediate effect; it is progressive. The impairment of function goes on with the impairment of strength. The exhausting march, or the stoking at the furnace, or labouring in the field, is still continued, and, before the victim is aware of it, possibly, the skin has ceased entirely to act. There are now but few avenues of escape for the systemic heat resulting from muscular action, from the oxidation of tissue, or from the hæmal oxidation of normal alcohol present in the lungs, and still less escape from the alcohol the man too often takes to relieve the exhaustion from which he is suffering. In addition to this, from the sun's rays the body is continually absorbing heat, until such a degree of heat is present in the system, that disorganization of the blood results, or the nerve-centres are so oppressed by its presence that insolation results. I therefore conclude that insolation is the expression of the presence of a morbid degree of heat in the organism dependent mainly on the arrest of the cutaneous function.

Pathology.—There are no uniform lesions revealed by *post-mortem* examinations in insolation. There is generally some one organ more prominently affected, as if the morbid cause had expended upon it all its violence. This want of uniformity depends in a great measure upon temperament, condition of the system, length of exposure or exhaustion, and the stage at which death intervened. Dr. Simpson concludes, from his *post-mortem* observations of the disease, that death, in a great measure, results from the entire or partial suspension of the depurative functions. Martin attributes the negative character of the necrotomic results to the rapidity with which the disease runs its course. In those cases occurring in the shade or under cover, in which the disease is more lingering in its character, the dura mater is remarkably congested, with more or less engorged condition of the lungs. In those cases occurring in the full force of the sun, there is found marked pulmonary apoplexy, and the brain is found to have escaped with no, or but little engorgement. In those cases of instantaneous death, with pale face and clear conjunctiva, no organic lesion is observed; the death being like that from lightning—a sudden invasion of the centres of organic life, and leaving no trace. Congestion of the lungs in all other cases is rarely wanting. The appearance of the blood, lungs, and brain, indicates that there is extreme venalization of the blood, resulting in narcotism of the brain and heart. Favourable cases occurring on the march present the appearance of cerebral syncope proceeding to apoplexy, and terminating in febrile reaction (Martin). According to Dr. Boislinière, moderate pressure on the thorax after death resulted in the expression of bloody froth from the mouth and nostrils, and on section it was found in the lung-tissue. So characteristic was this appearance, that *post-mortem* examinations were dispensed with, and the coroner's jury directed to bring in a verdict of death from insolation. Dr. Boislinière found the brain usually normal. In a few cases there was slight congestion of the superior cerebral veins and of the sinuses. This condition Dr. Boislinière accounts for by the difficulty of the return of the blood through the engorged venous trunks extending to the right side of the heart, and this setting back of the blood in the veins of the brain and sinuses causes an exhudation of serum often found. In his cases the presence of serum under the membranes was quite remarkable. In Mr. Longmore's cases, occurring in an unventilated air, the appearances after death were those usually resulting from death by asphyxia. In some portions the lungs presented the appearance of interstitial apoplexy. The engorgement of the brain was not a constant lesion, and when present was less marked, seeming to be subordinate to the impairment of the functions of the respiration and circulation. The substance of the brain on section often presented numerous blood puncta. Morehead says the

blood is always fluid, but some observers have found clots in the right side of the heart, extending throughout the venous trunks. According to Dr. Levick, a constant pathological condition was an altered state of blood, which is liquid after death, and under the microscope showed shrivelled and crenated corpuscles. According to Flint, the vessels of the pia mater are congested as in congestive apoplexy, but rarely the vessels within the cranium. Dr. Pepper found the heart in four cases flaccid, and structure softened. The late Inspector-General Murray, of Madras, supposed that the predominence of cerebral lesions in some cases was accounted for by the exposure of the bare head to the direct rays of the sun, but other *post-mortem* observations have not verified this opinion. The *débris* of the body, consequent upon the serious wear of the material of life, seems to overload the vital fluid : the skin and kidneys having ceased their function, the lungs are selected to accomplish this depurative act ; they, owing to the excessive attenuation of the air, are unable to effect this, and the blood, propelled by its *vis a tergo*, fills the lungs to engorgement. Mr. Hill, in many *post-mortems*, found the lungs engorged, and even extravasation in the pulmonary tissue. Mr. Russel, of Her Majesty's Seventy-third Regiment, in three cases found the lungs congested even to blackness, and so densely loaded that complete obstruction must have taken place. Drs. Mortimer and Green, at different stations in India, have recorded similar conditions of the lungs (Aitken). Mr. Hill has often observed an exsanguined condition of the mucous membrane of the small intestines, being pale and blanched, resembling the pathological condition of cholera. Fibrinous coagula in the heart is mentioned by M. Campet, forming a common pathological condition with yellow fever, or the malignant remittents of India.

Treatment and Prophylaxis.—A study of the symptoms will furnish ample data for treatment. In view of the exalted thermal condition of the body, means to combat that condition are evidently the leading curative measures. The cold douche is a most powerful means. The patient may be stripped, and cold water poured from a height of three or four feet. Ice to the head was first used by Dr. Darrach, in 1857. He details four cases treated in this way, three of which recovered. Although the douche and ice applications are valuable remedies, still we must bear in mind that depression of the vital forces forms a serious element in the disease. Care must be exercised that the cold applications are timely and only carried to that extent indicated by the condition of the patient, and the manner in which they are borne. In many cases we first see the patient in a state of collapse ; it would be obviously improper in this case to use a general cold douche. Cold applied to the head, and, if the patient can swallow, teaspoonful doses of brandy and chloroform, or any other diffusible stimulant, are indicated. Relaxation of the pupils is the first symptom of amendment usually following the douche. In case of relapsing insensibility, resort must be had again to the douche ; the hair should be cut short, and a blister applied to the neck or to the vertex. Sinapisms to the feet, calves of the legs, and chest, are in order when the relapsing insensibility persists. In cases in which the temperature of the body is lowered by the refrigerant measures, but consciousness or delirium persists, the cold applications should be at once discontinued, and stimulants and stimulating enemata, with sinapisms to the chest and extremities, be resorted to. As soon as may be, after the exhibition of the douche, a purgative enemata should be given, followed after its operation by an enema of turpentine. In cases of cerebral congestion, Longmore and Barclay recommend a few leeches to the temples. In cases of great oppression of breathing, and where the bronchial tubes are overloaded with mucus, the patient should be turned frequently over upon his face and side. Observers in this country and in India are united in their opinion against venesection of any kind, as blood-letting always appears to hasten a fatal termination. In the convulsive form of the disease, the douche *occasions great* distress, and ought not to be employed. In these cases

Dr. Barclay found the inhalation of chloroform very useful; the convulsive efforts ceasing after a few inspirations, but in several cases its employment seemed to hasten the fatal issue. But, as convulsions are ominous of that result of the case, the remedy may be free from blame. The free use of the bromide of potassium may be useful. In cases of tardy return of the function of the skin, the patient may be placed in a warm bath, rendered stimulating by mustard or capsicum.

Dr. Beatson, of the Indian service, gives a very judicious plan of ready treatment for military surgeons. He says; "Unfasten, as quickly as possible, the man's dress and accoutrements, to expose the neck and chest; get him under the shade of a bush; raise his head a little, and commence the affusion of cold water from a sheep-skin bag, continuing the affusion at intervals over the head, chest, and epigastrium, until consciousness and the power of swallowing return. When this takes place, the affusion may be stopped and a stimulant mixture given occasionally in small doses. Dr. Hewlett reports a case successfully treated by blood-letting, and the administration of codine and bromide of potassium in fifteen grain doses.

In speaking of the prevention of heat apoplexy, Sir J. R. Martin says, "The spirit-ration and the abuse of ardent spirits constitute the chief accessories." Sir Charles Napier, when serving in Sindh, says of an attack of insolation he suffered there: "I had hardly written the above sentence, ten days ago, when I was tumbled over by the heat with apoplexy; forty-three others were struck, all Europeans, and all died within three hours except myself! I do not drink! That is the secret. The sun had no ally in liquor among my brains." Martin gives it as his opinion that, by temperance in diet, with as little exposure to the sun as may be compatible with the service, the protection of tents; head-dress, and body-clothing being suitable, European troops will march well under the hottest sun of India.

Many of the French army surgeons in Algeria, and especially M. Scoutetten, insist upon the necessity of wearing a covering for the neck as an efficient means of protection against solar heat, the neck-covering being as important as the head-dress. In my own army experience, I always observed that soldiers uniformed in the ridiculous Zouave dress were very liable to heat-exhaustion and sun-stroke. In this uniform there is no covering for the neck, and the red fez and turban are the worst possible covering for the head. Troops in the field ought never to be allowed to wear it. Newly arrived troops in a hot climate ought always to be an object of special care to the officers. The protective helmet of Dr. Julius Jeffreys was of inestimable value to the British in India.

Dr. William Nolan, who had charge of one thousand men employed in building the Abyssinian railway from Zoulla to Kamaylee, under as hot a tropical sun as can be found in the world, says the men should wear a head-covering which will admit of being soaked in water, or a wet handkerchief under the ordinary head-covering; at the same time he permits the use of stimulants in moderation. The only head-dress worn by the natives of Abyssinia is a lump of butter, which by melting runs down the neck and shoulders, and prevents their drying in the intense heat.

The protective influence of temperance was effectually demonstrated by the British troops serving at the siege of Delhi. The officers marched many days in June, July and August, and served in the trenches exposed to a temperature of 130°, and preserved their health to a wonderful extent.

In regard to the prevention of this disease in civil life, but little additional may be said. It is common among labourers to wear dark-coloured flannel or cotton shirts. They ought either to be white or worn with a white cotton shirt over them. Dr. McDowall, assistant-surgeon of the Bombay Army, speaking of severe solar exposure in 1865, says; "We all suffered in exact proportion to the depth of shade of our flannel. Now, in the jungle in the hottest weather, and in the sun, I have often ridden, and do ride still, both for experiment and comfort, in my shirt sleeves; but that shirt is white. Any other colour requires a proportional thickness." The neck and chest should be covered. A light straw or palm-leaf hat with

a high crown is the most suitable head-covering for labourers in the sun, worn with fresh leaves or wet handkerchief in the crown. The workingman should always attend carefully to his diet, and never work exposed to a high temperature while suffering from the calls of hunger. The overseers of public works ought to impress upon their men the importance of total abstinence as a preventive of sunstroke. The violent reaction following stimulation is attended with most serious effects when the subject is exposed to a high temperature. Men should be instructed that, when they experience a sense of fullness in the head and of tightness across the chest, with a total or partial suppression of the perspiration, they ought immediately to stop work and protect themselves from the sun's rays until the functions of the body are restored. Persons in infirm health or convalescent ought to take extra precaution when exposed to severe heat. It should always be borne in mind that only sound and temperate men are able to bear severe exertion in a high temperature with impunity.—*New York Med. Journal, Aug.* 1870, *p.* 30.

11.—WHAT IS CHOLERA COLLAPSE?

By Dr. T. Farquhar, Surgeon-Major, Bengal Medical Service.

[On visiting a cholera patient, two things at once strike the attention, and instinctively as it were produce a certain plan of treatment, until experience proves the futility of that treatment, and leads to further investigation of the disease. The urgency of the abdominal symptoms leads to the use of opium, and the exhaustion of the system to the use of stimulants.]

What, let us ask ourselves, are the constant symptoms in cholera, for by attending to them we are most likely to understand the disease; and if we succeed in convincing ourselves as to what tissues are more directly affected we will be less likely to waste our strength in trying remedies at random.

They are not, let us premise, abdominal as far as vomiting and purging are concerned. They are not paralytic, they are not cramps, or a dozen other accessory symptons that might readily be enumerated as frequent in cholera.

What then are constant symptoms? There is pallor or lividity of the skin. There is rapid shrinking of the cellular tissue, with pinched face, and eyeballs shrunk into the sockets. There is death-like chilliness of the body; the breath becomes cold, the tongue is cold, the breathing is weak. Heart sounds are feeble, the pulse begins to grow thready and weak, finally disappearing at the wrist and in the larger vessels. Secretions of bile and urine cease. Blood, when drawn, is black and tar-like. Mind is clear almost to the last. Muscular force, though lessened, is yet considerable in relation to the fatal symtpoms present, and the near approach of death, which closes the scene.

After death there is blood in the pulmonary vessels and right side of the heart. The left side of the heart and arteries are empty. There is fullness of the vessels of the intestines, and fluid, I believe, or watery stools in them.

If the patient is to recover, which he often does, from the most fatal-like symptoms, the heat of the body gradually returns, the pulse in the larger arteries is felt, the pinched face and sunken appearance of the eyes are less noticeable, the body seems to fill out, the colour of the skin returns, the tongue and breath become warm, and last of all, bile appears in the liquid motions, and the secretion of urine is re-established. These are the symptoms of what we call collapse, a state of the system frequently seen from other causes, as irritant poisons, putrid meat, etc. In ague, again, from malarious poisoning we now and then come across cases which, in the cold stage, have such similar appearances that they can with difficulty be said not to be cholera.

These symptoms, which, as in the cold stage of ague, last for a limited

time, are more or less indicative of the spasmodic contraction and subsequent dilatation of the pulmonic and systemic capillaries. While in their contracted state we see the interruption to the flow of blood and its non-aëration producing all the symptoms of collapse, and on their dilatation the evidence of what we call reaction. In this belief we are established by the similar physiological effects observed to result from galvanic irritation of the sympathetic on the one hand, and division of the nerve on the other.

This spasm of the vessels is, then, what we often alone see in a case of true cholera. Presumably, this is what we have principally to deal with in this disease. If we are able to overcome this contraction and allow the circulation to go on through the pulmonary and systemic capillaries, we would keep the patient alive till the poison passed off by some of the secreting organs, or exhausted itself in the system. We have analogous instances to build this hope on in cases of poisoning by opium and snake-bite. If by the bastinado, or walking the patient about, you keep him awake for a given time, he recovers. If he is neglected, and allowed to sleep, he passes rapidly into a state of coma, from which there is no waking.

It would be certainly better if we could neutralise the poison, as we do in case of acids, etc., or purge the mass out of the body as we do of rotten food in the stomach. It would be well, also, if we could act on it, as we nowadays do on ague by large doses of quinine, or by ipecacuan in dysentery. Let us not lose heart in this matter, but hope that an antidote may some day be found for cholera, and may not the experience of the last two drugs lead us to believe that even now we may have the specific by us, when we remember for how many years these medicines were in our possession, but only lately were their value and doses discovered in India.

In speaking of treatment, it is far easier to say what to avoid than what to do. Dr. Murray's collection of Indian experience teaches one great lesson—viz., that we have culpably neglected, up to the present time, to institute a regular system of inter-communication on the subject of the treatment of cholera. Each individual or small group of men has followed different plans, based on individual theories, many ignorantly trying methods of cure that have notoriously failed in the hands of their predecessors. What we want now is, an organized system of positive information, based on carefully observed statistics, and some central authority through whom information on particular modes of treatment can be obtained. One thing most of us in India have learnt, and that is to avoid large doses of opium and stimulants in collapse. The opium has seldom if ever, at the time, the sedative effect we desire to see from it in ordinary doses, and is apt to be repeated and accumulate in the bowels. So that when we look for recovery we see death, with painful evidence that opium is the determining cause of the event. Stimulants, if not at once rejected, are followed by marked exacerbations of the severer symptoms, especially that tossing restlessness so markedly connected with the want of aëration of the blood; and in the stage of reaction, if it occurs, the mischief caused by them seems to be as great as if brandy was poured into the system of a man in the hot stage of intermittent fever, or suffering from an attack of heat apoplexy.

We each and all have our favourite remedies in which we believe. There are few, however, of these that we can enumerate with great confidence. A gentle aperient guarded by carminatives and a few drops of laudanum seems to act like a charm, however, in relieving the many who suffer from disordered bowels and the malaise of epidemic cholera. Indeed, in most epidemics, the numbers attacked with these milder forms of disease and who recover are so numerous, that it may be said few of the population in the affected locality escape. In the enumeration of deaths to sick, cholera may thus be said to be less fatal than several other more common but less dreaded diseases. Large mustard poultices, covering the whole of the abdomen and loins, are invaluable, probably by exciting the capillary cir-

culation, and relieving the abdominal engorgement and distress. Temporary benefit is seen to follow hot baths, warm saline injections, whatever, indeed, appears to relax the capillary arteries. Would that this their action would continue. Shampooing, with stimulant embrocations, give great relief; but to further enumerate such measures here would be useless.

One point not sufficiently noticed is the existence of choleraic diarrhœa observable sometimes ahead of the first pronounced case of cholera, and it may be certainly concluded that the disease is plentifully about in this mitigated form, while the severer cases are occurring. This diarrhœa is a fruitful means of propagating contagion, and in the unobserved wanderings from place to place of the sufferers, we have a ready explanation of the apparently independent outbreaks of true cholera cases.

In India what are called sporadic cases are so little liable to spread, that they do not demand any special sanitary measures.

When, however, as in the late terrible loss of life at Peshawur, cholera is on the move, the cases occurring are then known to be part of an expected epidemic attack, and the sooner all precautionary measures are taken the better. It is so far satisfactory to know that instant sanitary advice was given to the authorities there, and if delay occurred in carrying out the removal of the troops, executive or political difficulties were to blame.—*Med. Times and Gazette, July* 30, 1870, *p.* 117.

DISEASES OF THE NERVOUS SYSTEM.

12.—ON THE CLINICAL USES AND FORMS OF ELECTRICITY.

By Dr. J. Russell Reynolds, F.R.S., Professor of the Principles and Practice of Medicine in University College.

With regard to *treatment* by electricity I have a few general remarks to make. You can sometimes actually and immediately cure a patient. There are cases in which the only symptom that may be presented to you—I do not say the whole morbid condition, but the only symptom—is loss of voice. Sometimes one single application of electricity will remove it completely, and in that instance you do apparently cure the patient. There are other diseases which you cannot be said to cure, but which you may relieve by electricity. By its application you may, in many instances, again and again, relieve pain; you may, in like manner, relieve spasm; or you may slowly diminish, and even ultimately remove, paralysis. In these cases you assist, by electricity, the processes which lead to the removal of the pain, paralysis, or spasm; you put the patient, by electrical appliances, into a better position to improve, or be cured by the agencies of food, medicines, rest, and time. Lastly, there is a group of cases in which, though you cannot cure, or even relieve the symptoms, you may yet arrest the progress of disease. Sometimes, for example, in a child with so-called "essential paralysis," you may prevent deformity, though you cannot cure the paralysis. In certain cases of lead-poisoning, muscular atrophy, &c., although you cannot recall the muscular substance, you may prevent the atrophy from increasing.

I think it is necessary for me to say a few words as briefly as possible, about the several forms of electricity which are now in common clinical use. You constantly hear of "faradisation," "electrification," "galvanism," and so on; of "battery-current," "continuous current," and the like: and it is probable that some of you may not have perfectly clear ideas as to the meaning of these terms, or, at any rate, ideas which are precisely the same as mine, and I should like us to have a common starting-point, in a clear comprehension of the meaning of the words we use.

(*a*) Many years ago it was the therapeutic fashion to put the legs of patients into buckets of torpedoes, or electric eels; but this practice has *become obsolete,* and there are now only three forms of electrical appli-

ance in common clinical use. One is that of the old-fashioned "electrical machine," either a cylinder or plate of glass, which, by friction, produces a certain amount of electrical disturbance, one of the results of which you collect on an insulated piece of brass called a "prime conductor." This is the oldest mode of applying electricity which is now in force in our hospitals. In the present day it is sometimes called "static" electricity; and in speaking of the use of static electricity, what is meant is that the person is charged, like that "prime conductor," with electricity of that particular kind. It has also been called "frictional" electricity, from the mode of its production; and also "Franklinic" electricity, or "Franklinism," in memory of the individual who—I will not say discovered it, but who—made out more about it than any one else at the time that he worked at the subject.

1. There are three modes in which that electricity is applied. One is simply to make the patient, as it were, a part of the prime conductor, and charge him full of electricity. You insulate your patient by placing him upon a glass-legged stool, taking care that he is not in contact with any conducting substance; then you connect him by a brass chain, by his own hand, or by any other mode you like, with the prime conductor; you set the machine in action, and fill him full of electricty, do nothing more. That is the simplest mode of applying static electricity. In certain diseases it is curious what this will do, without putting the patient to the least discomfort. Probably the only thing he will be conscious of is that his hair seems to be "standing on end;" this is neither painful nor even uncomfortable, but it is wonderful how much that simple "charging" a patient will effect in some forms of disease. I have known it absolutely remove, in a few seconds, a "tic" that had lasted for days. Pain in the sciatic nerve, many odd and disagreeable sensations, unpleasant flutterings about the heart, depending on weak innervation, and tremor of the limbs, may all be removed by simply "charging" the patient.

2. Another mode of using this franklinic electricity is to apply a "spark" to a particular part. You may have a movable, insulated brass knob in connection with a prime conductor, and you direct it to the larynx, or some other part, and let the spark go into the skin. Or you may put the patient on a glass-legged stool, and charge him or her in the way I have described, and take a spark out of the larynx or the limb with your knuckle or with a rounded knob. In some cases of aphonia, where the aphonia depends on a special condition, you may insulate the patient and charge him with electricity without the slightest benefit; but take a spark out of the larynx, or put a spark in—whether positive or negative, it matters not—and that particular condition of aphonia may be cured directly. This I have known to occur when much more painful processes of electrification had been previously tried, and without effect.

3. A third mode of using franklinic electricity is that of sending the shock from a charged "Leyden phial" through the part that you wish to affect. This has occasionally produced curative results when other modes have failed; and it is in obstinate nervous aphonia that its influence has been the most distinctly seen. But, short of being hanged, I do not imagine that anything could be much more pleasant.

(*b*) The next form is what has been called Galvanism. It is the form of which one hears so much, in the present day, under the name of the "continuous current," or "battery current," or, as it has been sometimes called, with a Hibernian misuse of words, the "interrupted continuous current." By all these terms is meant that form of electricity which is developed by chemical decomposition. The particular form of battery does not matter, so far as the quality of the electricity is concerned. Wherever you have chemical decomposition in progress, there also is some electrical change going on; and the only object a medical electrician has, in choosing any particular form of battery, is to catch the electricity as best he may. This form of electricity is characterised by the following features:—It is of low "intensity," so far as regards its action upon nerve

and muscle, but it is in considerable "quantity," and it produces "chemical" results, and results on temperature, "thermic" results, that are not approximated by the franklinic electricity.

I am not now going to describe to you the batteries, of which there are numberless kinds. The choice among them is guided chiefly by considerations of cheapness, portability, the ease with which the machine can be kept continuously in order, the bulk of the battery, and the readiness with which its strength of action can be regulated. What you want is a current that shall play evenly, and at a measurable strength, for a certain length of time. It is convenient to have a battery that is portable, and it is a great point to have one that does not require everlastingly looking after. The battery in our electrical room in this hospital (Elliott's) is not portable, but the majority of our patients are: it will act very steadily for three or four months; it is tolerably cheap; it can be very readily put in working order by a person who does not need a great amount of electrical skill; and you can easily regulate the strength of the current you employ.

1. There are two modes in which this kind of electricity, or galvanism, is used. In one of them the current is "continuous," in the other it is not. A really *continuous* current may be passed through the body, or part of the body; and this is accomplished by introducing the whole or a portion of the human body into the circle of the battery, and then letting the current play through it. This will do the following things:—it will relieve spasm of certain kinds; it will relieve pain of certain kinds, and this sometimes in a few seconds, and the effect is as obvious and distinct as is that following the administration of an emetic. A person may have a particular kind of headache; you pass a continuous current, as it appears, through his head, and sometimes in a few seconds the pain is gone. It will also remove some forms of tremor and of spasm.

I want you to bear in mind certain points respecting the effects of the continuous current upon the limbs, according to the direction in which it is passed through those limbs. Supposing I have the positive end of the battery connected with a person's left hand, and the negative end connected with his right, the current passing from the positive to the negative pole goes up the person's left arm to the trunk of the body, and down the right arm to the machine again. The current passing up the arm has been called the "inverse," and that coming down the arm has been called the "direct." In the arm in which the current is passing upwards the "irritability" of the muscle and nerve is gradually increased; in the other arm, in which the current is passing downwards, the irritability is gradually diminished. You may test this fact by now and then breaking and remaking the continuous current; and you will find that in the two arms two different degrees of irritability exist, according to the direction in which the current had been passing, whether up or down. One arm will act more, the other less readily than in health. The difference thus produced between them is sometimes highly marked.

It may occur to you to ask, "If that be the case, which current should I use to relieve pain and spasm, the direct or the inverse?" All I have to say is, that so far as I have seen, it does not make the smallest difference. Theoretically it should make a very great difference, but practically it makes none. I have seen pain or spasm relieved as well by the current in one direction as in the other, and this whether the spasm has been clonic or tonic, or whether there has been merely tremor.

The continuous current, when weak, produces little or no pain. The patient feels nothing, or next to nothing. If it be strong, he feels a tingling or burning at the points of contact, and a sensation of tightness and tension in the part, between the points of contact, that is very disagreeable, or, indeed, intolerable.

2. Another mode of using the battery current is by *interrupting* it—making it not continuous. This may be done in various ways. You may *take the two* sponges attached by wires to the two ends of the battery, place

one sponge on the upper part of the man's leg, and interrupt the current by occasionally dabbling the other sponge on the leg at a more or less distant point. By that means you "make" and "break" the current. Or you may have a simple piece of apparatus attached to the battery—a cogged wheel, with alternating conducting and non-conducting materials; which wheel can be rotated, and so interrupt the current, while the sponges are maintained in place. Or you may use a little vibrating wire, which makes and breaks contact rapidly, as in one of Pulvermacher's interruptors. In thus applying the battery current you will notice this further fact—namely, that the "direct" application produces more obvious effects upon the muscles (*i. e.*, induces a more marked contraction) than does the "inverse" or "indirect." You will find, for example, that an interrupted battery current—say of ten cells—which when sent *down* the arm produces distinct contraction of the muscles, may elicit no contraction, or very much less contraction, when it is sent *up* the arm in the opposite direction. It is important to bear this in mind when thus using galvanism for the purposes of either diagnosis or treatment, as I shall hereafter show you.

(*c*) The third form of electricity is "faradisation" or "faradism." It has also been called "induced" electricity, "magneto-electric," "voltaomagnetic," "voltao-dynamic." When you hear used any one of these words, you will understand by them that particular kind of electricity of which Faraday was the great exponent. It is electricity of very high tension, and resembles more closely franklinic electricity than it does the galvanic current. The chemical action of faradisation is almost *nil;* the direct effect on temperature is almost *nil;* it causes no burning feeling, no sensation of heat, like that which is communicated by the galvanic current; but, under ordinary circumstances, it produces marked contraction of the muscles, and a powerful action on the nerves of both motion and sensation. It is an "induced" current, and is of momentary existence only; but these momentary currents may be repeated slowly or repeated quickly. It exists only at the moment of making or breaking the galvanic current, or at the moment of making or unmaking a magnetic condition in a piece of metal; but it may be made or broken so rapidly that you may pass very many currents in a second of time in both directions. Remember, lastly, that, though it is of momentary duration, it is of very high tension.

There are two terms used commonly about it, and which you may see on batteries of various kinds—"primary" and "secondary." It is for clinical purposes an almost useless distinction. The difference between the two has been said by some to be this—that the primary will have a more distinct action upon one set of nerves, and the secondary upon another. But the most marked physiological difference that can be made out between them is that the secondary is of greater intensity than the primary, and will sometimes proceed more deeply into the parts you wish to affect. It is an unhappy use of the word "primary," for the current so named is not a primary current in the sense of being a battery current; it is essentially an induced current. The other is an induction from an induction, and is "secondarily" induced, and the clinical difference between them is mainly one of intensity. If, then, you apply the terms "primary" and "secondary" to faradisation currents, remember that you should mean by *each* of them "induced."—*Lancet, March* 5, 1870, *p.* 331.

13.—ON ELECTRICITY IN MEDICAL TREATMENT.

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[There are three elements to consider when speaking of the modificaion of electric sensibility—namely, the skin, the muscles, and the nerve-trunks.]

1. In health, the application of electricity to the skin is accompanied by sensation varying, in kind and degree, in relation to the form and the force of the agent employed. Franklinic electricity, when used in the form of sparks, produces a stinging sensation in the skin, which is painful to some people, but not altogether unpleasant to others. The continuous galvanic current produces two sensations: one, a feeling of burning, which is intense in proportion to the force that is employed, and which is especially felt at the point of contact of the positive pole; the other, a sense of tension and thrill between the poles. Faradisation gives rise to a feeling of stinging or burning, in proportion to the intensity of the induction, the rapidity of the interruption, and the dryness of the conductors.

In disease, the electric reactions of the skin may be much changed. The patient may exhibit an increase, a diminution, or an entire absence of sensibility.

(*a*) Increase of sensitiveness is found in many simply "nervous" people, whose sensations are all, more or less, exaggerated. In them, too, you may observe much of the hysterical character, and sometimes it is obvious that the increase of sensibility is due to a central—*i. e.*, to a mental and moral—state, rather than to any peripheral change. But occasionally you find that the skin of one limb is more sensitive than that of its fellow, and usually that this increase is associated with augmented sensibility of the muscles to electric action. The diagnostic value of this change is identical with that of increased electric contractility, so far as the nature of the lesion is concerned, but it may differ from it in regard of the precise locality of change.

(*b*) Diminution of cutaneous sensibility to electricity is met with when there is the condition of "shock" which accompanies recent and suddenly induced paralysis; and at the same time there is, commonly, loss of tactile sense and of the power of appreciating cold and heat. It is also found in some cases of hysteria, apart from any paralysis or other change of motility; and it may exist, as a chronic symptom, in some very rare cases of central disease.

2. When the muscles are put into action by electricity the healthy individual feels their contraction. If the force employed be of low tension, and only slowly interrupted, the sensation is not unpleasant; but if the current be of high tension, or be very rapidly made and broken, the feeling in the muscles amounts to pain, and, indeed, to very severe pain, of cramp-like character. In health the amount of sensation is in direct proportion to the force of the contraction; but in disease this relation does not always persist; and, moreover, there are certain states of the nervous system in which both contraction and sensation are together morbidly exaggerated or depressed.

(*a*) Increased electro-muscular sensibility sometimes exists alone. I have found it in the trunk, or in all the limbs, or in only one of them, apart from any general or local increase of contractility. Patients sometimes feel, and feel painfully, an amount of muscular contraction which they would scarcely recognize in health; and this painfulness of muscular movement may be either general or local. It is usually dependent on change in the central nervous system, is accompanied by increased cutaneous sensibility, often by neuralgia, and by other modifications of sensation—pseudæsthesia, or dysæsthesia—which are sometimes erroneously termed hyperæsthesia.

The electro-muscular sensibilty may be augmented, *pari passu* with the increase of contractility. In such circumstances the muscles act more energetically, and the patient feels that action more acutely than he should do in health. Sometimes this condition is general, and then the only comparison that can be made is between the patient and the average of other men. But when the increase is local, as, indeed it often is, the limbs of one side may be contrasted with those on the other. The diagnostic value of such increase is the same in kind as that which I have already described to you when speaking of augmented contractility.

(*b*) The sensibility of the muscles is usually diminished when their contractility is reduced; and this diminution is commonly in direct proportion to that reduction—as, for example, in lead-paralysis. But sometimes there is other than this parallel deviation of the two functions from their healthy standard. We meet with cases in which the contractility persists, but in which the sensibility is diminished or extinguished. The muscles act well, but the patient does not feel their action. This peculiar relationship is observed in some cases of hysterical paralysis, but I have also found it in individuals who had exhibited none of the ordinary features of hysteria. On the other hand, it has been found that in rare cases of lead-poisoning the sensibility has remained intact when the contractility has been diminished. When contractility, as well as muscular and cutaneous sensibility, are all diminished in a limb or in one-half of the body, the condition is one either of "shock" or of extensive cerebro-spinal lesion; the time during which the symptoms have lasted, and the mode of their onset, will enable you to diagnosticate between them.

3. The nerve trunks appear to be so involved in certain electric applications that sundry sensations arise from their irritation. When the poles of a galvanic battery are applied to the skin in close proximity to one another the nerve-trunks may escape; but when they are widely separated some nerve-trunks may be involved in the circuit; and then, with the continuous current, there is, in proportion to its strength, a feeling of extreme discomfort—of straining and burning—between the poles, and some sensation of tingling, numbness, or "pins-and-needles" beyond their points of contact. If, under such circumstances, the current be made and broken, there is a painful feeling of shock at or about the joints which may be traversed. A similarly painful affection of the nerve-trunks may be observed when the conductors of faradisation are widely separated. But the most painful of all modes of electrification is that by the Leyden phial, the sudden jar which is given by this mode of appliance being such as few can bring their minds to bear. A strong shock from a large Leyden phial or from a battery of phials will sometimes completely paralyse nerves of both sensation and motion in the parts through which it has passed.

The application of electricity to the nerves of special sense produces sensations of special kind, such as flashes of light, a phosphoric odour, a saline and metallic taste, or a rumbling noise; and these sensations may be induced either directly or indirectly. Giddiness, faintness, or nausea may be also brought about by electricity; but the clinical uses of such applications have yet to be discovered.

In some cases of general torpor from cerebral disease or blood-poisoning, and in destructive disease of the spinal cord, and in these alone, do we find the diminution of electric sensibility in the nerve-trunks, when that function is appealed to in the manner that I have described.

Therapeutical uses of Electricity.—I told you in the first lecture that, by the aid of electricity, you might in some instances cure a case—*e. g.*, one of hysterical aphonia; that in other cases you might relieve the patient—of pain, spasm, and paralysis; and that in some other cases, although you could neither cure the disease nor actually diminish the symptoms, you might prevent their further progress—you might arrest the disease.

1. Remembering the objects that we have in view, let me recall to you for a moment what it is that electricity can do, in its several forms, in order

that you may understand the better how to apply it to the various conditions of disease.

First, it may call into action, or it may increase the action, of a nerve or a muscle; and this is what you want it to do when nerve or muscle is in a state of inaction or under-action.

Secondly, electricity may reduce, or even annihilate, for a time, the action of a nerve or muscle; and this it is that you may sometimes want to accomplish when a nerve or muscle is over-active. You can, therefore, use it, on the one hand, to reduce action or to stop action, when this is exceesive; or, on the other, to bring out the action of a dormant muscle or a dormant nerve. If you have paralysis, loss of sensation or loss of contractility in a muscle, you may, in many cases, so use electricity as to restore voluntary movement, to restore contractility, to restore sensation. If you have pain, over-action, or spasm—whether tonic or clonic,—you may so use electricity as to diminish those conditions, and bring nerve and muscle to their normal states. The mode in which you use electricity will determine the effect that you produce.

(*a*) The under-action of a muscle or nerve shows itself in either paralysis —using that term in its widest and most general sense—or in anæsthesia; or in diminished sensation—"hyperæsthesia," as it is sometimes called. It shows itself, also, in weakness of a limb; there need not be what we call "paralysis," but the limb on one side is weaker than on the other, although it is still under the influence of the will: by a strong effort, the patient may do something with it—may, indeed, put all its muscles into play, but the movements are slowly produced, and are wanting in force. Still further, this condition of under-action shows itself in a relative softness of muscle, and a flabbiness of limb; although, if you take a tape and carefully measure it, you will find it of the same size as its fellow. You can feel a great difference, which you cannot always represent by figures; but often there is, as the expression of central disease, actual, obvious, and measurable wasting of muscles and of the other tissues of the limbs.

(*b*) The over-action, or preverted action, of a nerve or muscle shows itself by spasm, as contrasted with paralysis; by hyperæsthesia, as contrasted with anæsthesia; or by spontaneous pain, or something which is not spontaneous pain, or genuine hyperæsthesia, but which has been called "dysæsthesia"—viz., a painfulness of those sensations which are habitually unfelt when produced by ordinary impressions. For instance, when there is "intolerance of light," it is not that the patient can see better than you or I; he cannot see nearly so well, but he suffers pain during the ordinary act of vision. Do not confound this with genuine hyperæsthesia. The latter is rare, the former comparatively common; but both may be sometimes relieved by electricty.

There are, further, two conditions of the muscles which are the opposites of those I mentioned just now—viz., first, hardness of a limb, where it does not amount to actual rigidity; and second, actual rigidity, in which it is difficult to flex or extend the arm or leg. Further, there is a tremulousness of a muscle; and lastly, clonic spasm, showing itself in slight fibrillar twitching, or in catching movements of the limbs. These are all signs of an over-action that may sometimes be reduced by electricity.

As part of its effect upon muscular fibre, you must regard also the action of electricity upon the vessels. The effect on vessels is simply an extension into another region of that which I have already told you occurs in voluntary muscular tissue. There are certain contractile fibres in the walls of the vessels, and you can influence them by electricity in the same way as you can other muscular fibres. If the vessels are dilated, as they very often are, in paralysed limbs, you find that the skin has a dusky, bluish-red tint, and that the limb is cold. Look at the hands of a semi-paralysed patient; you find the nails a bluish-red, the extremities cold, and the capillary vessels large. No part of the hand is actually white, all is dusky pink. Here electricity is useful; it contracts the dilated vessels, and induces a healthy *state of* the circulation in the limb, which no other means will produce so

readily. You can do this, as I have seen again and again, without any electrification of the voluntary muscles. If you act on the muscles of the limb, and draw the hand first one way and then another, you gradually increase the circulation; but, without calling forth the action of any of these muscles, you can restore or much improve the circulation in the skin, by a simple superficial electrification.

It is possible that electricity might have some effect upon another condition of blood-supply, just the opposite to the last—viz., that in which the vessel is contracted by the spasm of its contractile fibre. I do not know that here electricity has been of any practical service; but it is possible that, under some circumstances, it might be of use. At the commencement of an epileptic seizure, there is often a curious pallor of the face, and to a condition analogous to this in the pia mater it is probable that the loss of consciousness is due. It is possible that if one could catch a patient going off into a fit one might stop or check the paroxysm. In those persons who are subject to sudden pallors coming over the face, it is possible that by a due administration of electricity something might be done. I know of no reliable clinical facts about the electric treatment of this state of spasm; but in the other condition, in which you get engorged vessels from loss of contractility of the fibre, electricity has been very useful.

2. And now, what are the modes of using electricity for therapeutical purposes? Over-activity of a muscle, or nerve, or vessel, may be reduced by the application of the continuous galvanic current, direct in its course through the limb, passing, that is to say, downwards and not upwards. And remember, that this continuous current should not be so strong as to cause pain; it should be applied so as not to irritate the skin, and it should be applied in the course of the nerve, from above downwards.

Another form of electricity—faradisation—may also be employed to reduce over-activity. If you find, for example, a man suffering from torticollis—spasmodic wry-neck,—the sterno-cleido-mastoid and other muscles of one side acting most violently, and turning the head over to the opposite shoulder,—you may stop that by passing through the sterno-cleido-mastoid muscle a galvanic current, or by applying weak faradisation, rapidly interrupted. The interruptions have to be very rapid, for if they are not so the application only increases the muscular action. The interruption in a rotary magneto-electric machine is scarcely rapid enough, and is often very irregular; one of Stöhrer's batteries may be used. Remember, then, that the over-action of a muscle may be reduced by the application of faradisation, as well as by the continuous current; but that the faradisation must be weak and rapidly interrupted. Another way by which you may reduce the over-action of a muscle is by faradising the antagonist muscle. Supposing the flexors of the arm are contracted, as in some cases of "late rigidity," and you find it difficult to get the fingers open—the best mode of overcoming that condition is to apply faradisation, not to the muscles affected, but to the other muscles, the extensors, so as to antagonise them. Again, in the case of torticollis, where a man's head goes jolting over to one side, you can reduce the over-action by putting the antagonistic muscles into action by faradisation, and so pulling the head round into its proper position.

By the third form of electricity, also—static or franklinic electricity,—you may reduce over-action. For instance, in some forms of tonic spasm and painful affections of nerves you may reduce the over-action by charging the patient from a friction machine. Thus, those over-sensitive conditions of nerves which go by the name of neuralgia may many of them be at once removed by a charge of static electricity and in the same manner the electric charge may be employed for the reduction of clonic spasm, or of that tremulous condition which resembles or passes into the state of paralysis agitans.

When either a nerve or a muscle exhibits diminished activity, you may

often recall its functions to their proper standard by the use of electricity; and for this purpose either of the three forms of application may be employed. Franklinic electricity is distinctly useful in some cases where faradisation may have failed; but the interrupted galvanic current, and faradisation, are those which are most commonly applied.

In passing from these generalities to details of electric treatment, I will first speak of cerebral and then of spinal lesions.

3. First, let me direct your attention to those cerebral diseases which cause paralysis; and, at the outset, request you to be cautious. If, under any circumstances, paralysis, induced by cerebral disease occurs suddenly, you should not use electricity at all—at any rate as a therapeutic agent—until some little time has elapsed. If you want to examine the limb, now and then, for the purpose of diagnosis or prognosis, you may use it very cautiously with a low power—*e.g.*, a Cruikshank's battery, or some other form of galvanism. It is better to avoid faradisation all together, for you may set up mischief, or, if you do not set it up, some mischief may occur, and you may get the credit, or discredit of having caused it. Remember that the discredit may be entirely due to you for having used electricity indiscriminately. When there is any sudden paralysis, from any cause—whether hemorrhage into the brain, or some embolic blocking up of a vessel, or some sudden congestion,—it is very unwise to disturb the patient in any way; the best thing for him is to be left alone: so pray do not use electricity.

But when the onset of paralysis, due to cerebral lesion, is not sudden, there is one condition under which I should advise you to be very cautious how you use electricity, and that is when such paralysis is attended by pain in the head, weight of head, or giddiness of head. When these symptoms are present, it is well to postpone, at any rate for a time, electric treatment, and this although the symptoms have come on gradually. But supposing that the paralysis has come on slowly, and is unattended by any pain in the head, or by any of the other symptoms I have mentioned, you may use it, and that fearlessly; but, at the same time, you must be cautious in your mode of applying it, for, although you may be fearless about it, patients sometimes may not be so; and it is very desirable not to throw electricity into disrepute by so frightening a patient with your apparatus, or your mode of using it, that you get the consequences of fright set down to the bad effects of electricity. I have known this to occur in several instances. Young children, and even some who in other matters are not children, have sometimes been so frightened by the look of an electric machine, that serious mischief has been done by the fright—mischief which the electricity used could not possibly have produced, and which has some times been set up when the machine has not been used at all.

I pass on now to the consideration of those cases in which you may be reccommended to use electricity therapeutically, and here must redirect your attention to their varying conditions.

(*a*) First let us consider that condition in which the contractility of the paralysed limb, when you first apply the electricity, is good (testing the contractility, of course, according to the mode I spoke of in the last lecture). On applying the current you find a fair amount of readiness in the response of the muscles. The patient feels the electricity, and you can see the muscles act. It need mot move as strongly as the healthy limb; but it moves, and you can see that it does. There may, or there may not be any rigidity of muscles under these circumstances; but, in either case, you do little or no good by electricity. You may diminish the rigidity, you may improve the condition of the muscle, it may become firmer, the limb may become a little warmer, the colour may be more natural, that dusky blue tint that you so often find may be removed; but so far as the paralysis is concerned you may go on electrifying the patient day after day for a twelvemonth, and at the end of that time find him as much paralysed as he was at the beginning. That is my experience, and it is so with regard to each form of *electricity.* It is true also whether the paralysis of the limb be complete

or incomplete. In direct proportion to the amount of contractility present is the uselessness of electricity. If the contractility be perfect, although the paralysis to the will be absolute, you can do nothing. If the contractility be retained, and be only very slightly diminished, you will very slightly improve the condition of the limb, and very slightly improve its relationship to the will.

(*b*) When the contractility is much diminished, there is much good that you may do, and you will be able to do it by working upon this plan. Use electricity—in such a form as you will select on the principle I shall mention in a moment—till you bring the contractility of the limb up to the normal standard, and, when you have done so, stop. You will usually find that the paralysis is diminished, and, in some cases, that it is cured. Let me remind you that it is the contractility, and not the power, of the muscle which is to be your guide, and assure you that to continue electric applications when the contractility is normal is to waste your own time, disappoint your patient's hopes, and bring electricity into disrepute.

There are two principal modes in which you may recall the lost contractility, viz., the application of the battery current, and the application of faradisation; either of these will be of service, and you may be guided in your choice between them by considerations of convenience. Bet supposing that you use the battery current, it must be interrupted. The continuous current for this purpose is of little or no avail.

Supposing that you want to apply galvanism to the arm or the leg in an ordinary case of hemiplegia, where you find the irritability less than in health. The best way to apply the electricity is to take big sponges attached to handles; not little sponges, such as are applied with some machines, the size of the tip of the little finger, but good-sized sponges, as large as three fingers, a good inch in diameter. The handles should be of such a shape that you can take two of them in one hand, which for certain purposes is very convenient. Supposing it to be the arm that you wish to apply it to, take one sponge, well wetted, and put it on the shoulder, over part of the deltoid muscle, with the left hand, and take the other in your right, also well wetted, and stroke it down the arm over the lower part of the deltoid, then down the back over the triceps muscle, and then over the biceps in front, still keeping your left hand upon the deltoid. You need not spend much time over this; a few brushings down, occupying a few seconds, are enough for the arm muscles. For the forearm, bring the upper spunge down to the hollow in front of the elbow, and then give a separate stroke to the muscles here and there over the forearm. In the early days of a case of paralysis of the upper extremity depending on cerebral causes, I should not advise you to waste time, as you would be doing, in devoting much attention to the small muscles of the hand. You may simply take a sponge and bring it down the fingers. In the lower limb you may in the same manner take one sponge and place it on the gluteal region, and with the other work down the limb. What you are doing is this: you are constantly making and breaking the battery-current through the limb by moving the sponge slowly downwards. If you were to leave it in one spot, it would be a constantly continuous current through the limb. By moving it you at the same time bring the current through every point of the muscles, so as to embrace each, from one end to the other, in an interrupted battery-current; and that is what you want to do to waken up its sensitiveness and contractility.

Respecting the use of electricity in this form, you will sometimes see statements made about the use of the inverse current in one case, the direct in another. I have never seen the slightest difference between the two, in their therapeutical effect, upon paralysis, and I have compared them again and again. If the current act continuously, the physiological effect on the nerve does differ in the two cases, the current downwards diminishing the irritability, the current upwards increasing it; but the therapeutical effects of the direct and inverse currents, applied as I have described, do not differ. In speaking of this, let me remind you of another fact which I

alluded to in the first lecture, viz., that the current in passing down a limb acts more strongly than it does in passing up it. Supposing we had a Cruikshank's battery here of five cells, and that five cells was the minimum power that would induce contraction in a limb when the current was passing down the limb; you will find that the current from the five cells, if sent up the limb, will not produce contraction. So you must remember this fact in relation to the strength of the current.

So much, then, for the mode of application of the battery-current: a large spunge, well wetted with salt and water; the upper sponge kept pretty steady, the other one moved slowly down the limb along the course of the muscles so as as to embrace different portions of muscles in the current, and using a stronger or a milder current, according to the direction in which you send the electricity. But which ever form you use, please remember that you are to use such a force as is not painful; and you are to use such a force as will produce contraction. So just stop between the two extremes; do not use so weak a force that it is doing nothing, or so strong a force as shall be doing harm. The best guide for you, until you have had some experience of the individual upon whom you are going to apply it, is to try it on your own hand first; place it on your own hand, and use such a power as shall just to your own consciousness feebly move the muscle. You find sometimes that you are more sensitive than your patient, sometimes that he is more sensitive than you; but do not use any strength that hurts you. Whatever hurts a muscle, so far as the sensation of the patient is concerned, positively hurts the patient. Electricity should never hurt people if you want to cure or relieve paralysis. Use such a power, then, as shall be distinctly, but not painfully, felt. I think that too great importance can scarcely be attached to this. I have known electricity so applied to a patient's limbs that he or she has almost fainted, and the electricity has done no good. Of course not. The idea of applying electricity to a paralysed limb so as to put the muscles into a state of cramp! That is the most mischievous thing you can do. Instead of waking up a natural action, you put it into the most hurtful form of action.

Further, do not prolong the application until the muscles or the patient is tired. If you wear the muscle out, you do it as much harm as when you pain it. A few seconds devoted to each muscle are quite enough, and you may repeat this every day, or you may repeat it every other day, according to the sensitiveness of the patient. It is very much better to repeat it even twice a day, where arrangements for so doing can be conveniently made, than to continue it for a number of minutes at a time, and so distress or weary the limb. If you find that the application of this or of any form of electricity is followed by weariness in the limb, giddiness in the head, pain in the head, a feeling of faintness or of sickness, a nondescript sense of discomfort about the epigastrium, do not go on with the electricity at all; cease altogether for a time.

If you are about to use faradisation, there are two or three points to be observed. You are not to tire the patient, not to pain the patient; therefore your application must be brief, and your current of moderate tension. You are to apply faradisation with well-moistened sponges, or buttons covered with wet chamois leather; because, otherwise, you may irritate the skin, but produce no further action. You are to apply the current to the muscles; but there is a difference in the mode of application of the faradic and the galvanic current. With the galvanic current you may place, as I said, one sponge on the shoulder and the other on the palm of the hand. Do not do that with faradisation, but keep the two poles near together. It is never worth while, and never advisable, to separate them widely. It is a good rule in ninety-nine cases out of a hundred, to hold both in one hand. There is a double reason for this; one is, that you cannot then get them very widely separated; the other is, that you have the remaining hand at liberty. If you separate the two poles of a faradic *apparatus widely*, you are in great danger of giving the patient pain without *doing him good*, and upsetting the circulation in his head. If you

take a tolerably strong faradic current and apply it to the palms of both hands, you will find very uncomfortable sensations in several parts, especially in the joints, wrists, and elbows; and, if you look, you will see very little muscular action at all. On the other hand, if you put the two poles near together, you will find that you can put the muscles of the limb into tolerably strong action with a comparatively weak current, and without causing any pain.

In the treatment of paralysis it is important for you to bear this in mind. Take both poles in one hand, and act upon all the muscles *seriatim*. Begin with the deltoid, first acting on the anterior set of fibres, then on the middle, then on the posterior; go down to the biceps and triceps, and then faradise the upper part of the forearm. In the first few applications you need not go beyond the arm and forearm; and afterwards, when these are in a better state, it is desirable to pay special attention to the muscles of the hand. In these you want handles with rounded ends, narrow stems, and metallic buttons covered with chamois leather. Make them wet; take the two in one of your hands, and pick out the different muscles of the patient's hand separately, and especially the little interosseous muscles. By groping about you will gain a certain amount of skill, so as to be able to pitch quickly on the particular muscles that you want to influence.

You will find that in both arm and leg there are particular points at which, if you apply your current, you will put the muscles into much stronger action than if you apply it elsewhere. Generally speaking, these points are where the nerves entering the muscles are most superficial; knowlege of anatomy will help you to find these points; but there is sufficient variation from these to make it necessary for you to examine the question electrically, and to discover for yourself—even in special cases—the points through which the current may be sent with the greatest efficacy.

Sometimes you will find curious actions which you cannot very readily explain. For example, in faradising the peroneal muscles and the tibialis anticus, by applying one pole just behind the head of the fibula, you may, by placing the other pole above the knee, on either side, raise the heel from off the ground or the bed, by calling the psoas and iliacus muscles into action. I have seen the foot raised from eight to ten inches from the floor in this manner, by a patient who could not lift the heel higher than two, or at the most three, inches by the extreme of voluntary effort.

Now, what do you do when you apply electricity in this way? You may restore, if it be lost, the nutrition of the muscles; you bring back their bulk. If the limb be cool, as it very often is, from the defective circulation, you may bring back the normal temperature. When the contractility has been defective, you bring that back to its normal state, and you will find then that you have very much improved the relationship of that limb to the will of the individual—that is, you *pro tanto* improve, or it may be entirely cure, the paralysis. The mode in which electricity produces this effect, so far as we can understand it, is this: A limb has been out of use for a certain time; its muscles and nerves have lost their nutrition and their readiness to act; and the application of electricity has quickened the circulation and restored the diminished function of those tissues. We may, I think, go still further, and affirm that, in some instances, much more is accomplished than this merely peripheral effect. By stirring up the muscles and nerves of a limb, you may, to a certain extent, act upon the other ends of those nerves—the ends that are in the back or head—and so you may improve, by careful usage, the nutrition of the spinal cord, or of the brain. There can, I think, be no doubt of the reality of this secondary result. It is obvious that faradisation of the extremity may seriously derange the circulation in the head; and it is no less clear that its application may be followed by results which a change in the conditions of the limb will not explain.

4. There is another point to which I will call your attention, and that is

the condition of "rigidity" in a limb in cerebral paralysis. It is common enough in old cases, and sometimes is met with in those that are quite recent. In the latter cases I advise you not to use electricity, for you may do harm; in late rigidity, you may employ it without fear, and with considerable advantage. Here you may either remove the rigidity altogether, and also improve the contractility of the limb, or you may only diminish the rigidity, or prevent its increase. It often happens that in a case of three or four months' duration you find the flexor muscles beginning to contract, so that the patient, waking up from sleep, in the night or in the morning, always finds his fingers bent, and the forearm prone, the flexure soon passing away again by a little rubbing or passive movement. After a time, although the hand may still be opened, it shows a constant tendency to close when it is left to itself, and at last the closure gradually becomes habitual. Now, the best way to counteract this tendency to closure is to faradise the antagonist muscles, the extensors of the fingers, and supinators of the forearm. Under such circumstances, you need not begin at the shoulder, because contraction of the kind I have been speaking of always begins at the distal end. You do not notice rigidity of the elbow till some time after you have noticed it at the wrist, nor do you observe rigidity of the wrist until after that of the fingers has been conspicuous. Sometimes in an early stage a few applications of electricity will cure the rigidity, and not only remove the tendency to cramp, but even bring back the proper contractility of the limb. But in more severe and protracted cases, in which there is some persistent, and often progressive, lesion of the head, you cannot cure the rigidity—*i. e.*, you cannot remove it altogether; but even in these cases, you may sometimes do good. You may prevent it from getting as bad as it would do if left alone, and this is a very important thing to do; for, after a longer time, the rigidity becomes extreme, and the patient often refuses to submit to any treatment. Then it is found that the nails have dug into the hand, and that the pent-up perspiration has become fetid and disgusting. It is impossible to prevent the occurrence of sores in some cases, except by a timely electrification of the extensors. You may often call into action the extensors of a much weakened hand by applying a moderate faradisation with well-wetted sponges to the back of the forearm, or you may use galvanisation for the same purpose, interrupting the current in the manner I have described, viz: by putting one sponge on the back of the forearm over the skin well wetted, and making and breaking the current with the other hand by moving the sponge upwards and downwards an inch or two below the upper pole. But faradisation is much better for this purpose than is the battery current, although the latter may be used to assist the former by applying it, in a continuous form, to the rigid and overacting muscles. For this purpose the current should be direct; one pole, well wetted, should be placed in the hollow of the elbow, and the other in the hand. A moderate current should be allowed to pass continuously from the upper to the lower for ten, fifteen or twenty minutes, once or twice daily, according to the severity of the case. You faradise the extensors, and galvanize the flexors of the hand and fingers; and you may, if the rigidity has extended higher, adopt a similar plan with regard to the muscles of the forearm or the arm.

5. Shaking movements sometimes occur in cerebral diseases, and may take the form of mere tremulousness, or of clonic spasm. In these cases relief may be given by two forms of electricity. It may be given by static electricity, charging the patient generally with positive electricity, and leaving it there, having previously placed him on a glass-legged stool. Or you may pass a continuous current, of low force, through a tremulous limb. In this case the best way of applying it is to place the patient's feet in a pan of salt-and-water, to put the pole from the negative end of the battery into the water, and then let the patient's hand be placed in a basin of salt-and-water, connected with the other pole. The current will then come up the leg and down the arm; and you will find that in many *cases* of tremor or clonic spasm accompanying paralytic conditions

dependent on cerebral disease, this continuous current affords marked relief.

6. It will be well to consider here the electrical treatment of chorea. Years ago it was said that good results were obtained; but I must say that, so far as my own experience goes, electricity has done no good in this disease. There are a vast number of cases of acute chorea that will get well if you leave them alone; and almost any form of treatment will appear to prove efficacious if it be taken in conjunction with change from a crowded dwelling-house to a well-ventilated hospital ward, to good food and quiet. I believe a great deal of the influence set down to electricity, ice-bags, iron, arsenic, quinine, and other medicine, has been imaginary; and that the really curative agents have been those that I have mentioned. The modes employed have been as the the forms of electricity, and each one has lauded in the treatment of chorea that particular form to which he is addicted; but in my judgement, the less one says, in the present state of knowledge, about chorea and its treatment by electricity, the better will it be for therapeutical science.

7. I pass now to the consideration of some brain affections that are accompanied by alterations in sensibility. And, first, defective sensation, or anæsthesia. Anæsthesia of a limb, or of two limbs, is very rare, except in association with motor paralysis; and then, when it has occurred acutely, it usually exists only during the condition of shock. A patient, for instance, may become hemiplegic from an embolism, or from hemorrhage; and you will find that during the first few minutes, or sometimes few hours, or, in rarer cases, days, after the onset of the attack, there may be some loss of sensibility. It varies in amount, but, during the condition of shock may be occasionally well marked. But after that condition of shock has passed away the sensibility commonly returns; and, so far as electricity is concerned, all I have to say is that, during that time, it would be very unwise to use any form of electricity at all.

In certain brain diseases of slow development you may find loss of insensibility; but these are, comparatively speaking, rare. You every now and then meet with some portion of skin defective in sensibility, from a tumor in the head or some other cause. But it is much more common for you to find some modified sensibility, such as "pins and needles," or painful impressions when the skin is touched. In those cases of acute cerebral disease, however, in which you do find persistent anæsthesia, or even only diminished sensibility, it is very rare for you to find that electricity does any good. It may do harm, and I should advise you not to use it unless the case were of such sort that you used it only for the purpose of diagnosis, and then only in such a form as you feel quite sure can do no mischief.

The examples of anæsthesia in which electricity is most useful are to be found in that curious class, or rather medley, of cases that goes sometimes by the name of "hysterical"; for they are met with in women, and are found together with symptoms of the kind commonly regarded as hysterical. Here you meet with marked anæsthesia of the skin in different parts of the body, almost always associated with a certain amount of awkwardness of movement, and sometimes associated with some very definite loss of power. The two often go together, for both the apparent power of combining movements are distinctly related to the integrity of guiding sensations derived from impressions made upon the skin. I have known cases of this kind which had lasted for months or years, in which movements of the body or of certain limbs were weak and clumsy, and in which the patients, finding it awkward to use their limbs, had ceased to do so, and in whom, from disuse, the muscular power had become defective, but in which electricity has proved wonderfully useful; for sometimes, after only a few applications, the sensibility and motility has been restored completely. Electricity should here be employed in such a manner as to produce a *definite and distinct impression* on the skin. Supposing there

is anæsthesia of the skin of the leg, place one pole of a faradic apparatus in the patient's hand, attach to the other a dry metallic brush, and pass it over the surface of the skin. In that way you send in a number of little bright sparks, which you may see very plainly in the dark, and you sting the skin very briskly. Or you may take a charcoal conductor, or a metallic conductor, and move it up and down on the surface of the skin. In the first few moments perhaps the patient does not feel it at all, but you now and then find the sensibility of the skin return with marvellous rapidity. Sometimes you will find it is a better plan to take two thoroughly wetted sponges, and a tolerably strong current to make the muscles act briskly. By so doing, in the course of a few minutes the skin will often recover its sensibility. I am not able to explain thoroughly why this should be, but I have seen it again and again. An analogous condition is that in which the skin retains its sensibility while the muscles have lost their contractility, and in which by stinging the skin you will sometimes restore the muscular contractility.

Whatever may be their explanation, these are facts, and they have a certain relation to each other. In facial paralysis, for instance, by stimulating the skin, either by electricity or by a blister, you may often bring back the muscular action very speedily. Or, where there is a loss of sensibility of the skin, the muscles acting tolerably well, you may, by putting them into forced action, restore the sensibility of the skin.—I think that most likely what one does under these circumstances is to stimulate that which is common to both muscle and skin—viz., vessels; and, further, that, in thus acting on the skin, we exert some influence on the nerve-trunks, and also on their central extremities.

You may accomplish the same end by franklinic electricity, by directing sparks from a prime conductor to the part affected, or by "charging" the patient, and taking sparks away from the surface by your knuckle or a brass ball. The effect of this application is that, in a little time you redden the skin, and restore the sensibility. In extreme cases you may go still further, and apply a moderate charge from a Leyden phial. For instance, you may enclose a limb between the knob and the discharging rod, and let the shock go through it. This will sometimes bring back the sensibility when other means have failed.

8. There are two classes of spinal diseases to which I have already alluded, in one of which you have the true "spinal paralysis" of Dr. Marshall Hall; in the other of which you have "cerebral paralysis," although depending on spinal disease. In the one the muscle derives nothing from the cord, because the latter is diseased or destroyed; in the other the muscle is still associated with the cord, though that cord may be cut off from the brain.

(*a*) First, let us take the case of the true spinal paralsyis. What can you do there electrically? The damage done to the cord is to be measured by the loss of electric irritability, and this whatever may be the form of electricity that you employ. If the electric irritability, in a case of this kind, be absolutely gone, and show no sign of reappearance after four or six applications, your prognosis is bad, and there is little or nothing to be gained by a persistence in the treatment.

Where you find a certain amount of contractility remaining there is a great deal to be done. You compare the limbs of your patient with the healthy limbs of some one of the same age and sex, same class of constitution and thickness of skin, and if you find contractility diminished somewhat, but not lost, there is much room for hope; and a great deal will depend upon what you do as to the upshot of the case in the future.

Take, as an instance, the case of "infantile paralysis" (so-called "essential paralysis" of children)—one of the best examples you can have. A child is a little feverish for twenty-four hours; you find it cannot sit up, cannot move its arms or legs for a few days. Then it begins to move one *arm a little*, and perhaps one leg; after a day or two more perhaps both

arms. If you do not notice it again for a week, you may find one limb completely paralysed and the other partially; the distribution varying. Post-mortem examination in such a case shows very often disease of the spinal cord itself, running along its whole length; a disease which, when left to itself, eventuates in the destruction of the tissue of the spinal cord; producing in the first instance perfect spinal paralysis, and in the last instance perfect spinal paralysis also, but the former curable, the latter perfectly incurable. In the early stage you find a certain amount of contractility left, but that is very defective. Here very much may be done by electricity. You find also this curious point that the muscles respond much more readily to a slowly interrupted current than to a rapidly interrupted curent. To faradisation you find them defective, and sometimes you cannot get them to act at all. If you interrupt the battery current very rapidly, they sometimes will not act to it; but if you interrupt it slowly, you find that they do. And what is very interesting about these cases, and to which I have already alluded, is this: that the muscles sometimes appear to act much more readily than those in health to a very low current of galvanisation.

To such cases the battery current, slowly interrupted, should be applied with a wet sponge, in the manner I described the other day. It should be applied every day for a few minutes, not troubling yourselves, at first, about particular groups of muscles, but just applying it to the whole limb. If it is the leg, put one of your sponges on the sacrum, just below the groin, or in the gluteal region, and move the other sponge slowly down the front of the thigh, and then the back of the thigh and leg. You often find, under such circumstances, that after a day or two you have to use a stronger power to produce the effect that you produced at first; and you will find at the same time that the muscles respond more readily to faradisation. It is well then to change, and employ faradisation instead, using it with sponges well wetted, trying to pick out particularly certain sets of muscles which have a trick, as it were, of lagging behind the others. These are, especially, the extensors of the foot, the peronei, and the extensors of the fingers. Here, then, you may apply faradisation; and if the disease in the spinal cord be curable, I am sure you assist the process of the cure. If the disease has existed for some time before the case is brought to you—and cases are often brought after three or four years' duration,—you will still find that occasionally you can do something. You may call into exercise the muscles of the limb; you can improve their nutrition and their strength; and you may do something towards effecting a change in the nutrition of the cord itself. Where, however, the disease has existed for some time, I have not seen that the repeated use of electricity has done much good, unless the improvement has been rapid at the commencement of treatment. You may see some enlargement of muscles, but there the improvement ends. When you find that after four or six applications, there is no sign of electric contractility either by the induced or the battery current, it is useles to go on. I have managed every now and then to have cases treated for many months, with the forlorn hope that at some period or another there might be a ghost of contractility returning, but I must say it has been utterly unsuccessful.

(*b*) Let me now direct your attention to cases of paralysis, dependent upon spinal disease, in which there is not any true "spinal paralysis"; for the muscles still retain their connection with a healthy portion of the medulla, although, owing to disease at a higher level of that medulla, they are completely paralysed to the will. In these cases electricity can accomplish but very little, and yet that very little may be of considerable service. Every now and then a certain group of muscles especially suffers; the sphincters of the bladder and rectum are very prone to be deranged. Sometimes the expulsive power is affected, sometimes the sphincter. It occasionally happens that, although you cannot in the smallest degree affect the limbs of the patient, you may give the patient a little more power over the sphincters. Probably the nutrition has failed, and the condition is *something like that which* I have already described. You may bring

back power enough to make the sphincters competent; and to do that is to afford great relief. If you want to apply it to the sphincter of the bowel, the best plan is to put one sponge of the faradisation machine over the sacrum, and the other well wetted, to the anus; and if you want to apply it to the sphincter of the bladder, you place one sponge, well wetted, on the perineum, just behind the scrotum, and the other over the symphysis pubis. By such means you may prevent the frequent involuntary passage of evacuations. I do not say that you will do it in all cases, but you will in some.

But, again, you get cases in which the disease of the spinal cord is such as to produce only incomplete paralysis. The limb is weak, the contractility is less than natural, and the nutrition is disposed to fail. Can electricity do anything there? I think it may do a great deal; these constitute the class of cases in which it does very much good. But here you must observe the caution I gave you in the last lecture—not to use too strong a current of electricity during the early days of an acute illness. If you suppose the patient to be suffering from the effects of a recent myelitis, meningitis, or hemorrage into the cord, it is a very foolish thing to galvanise him. If, on the other hand, disease is creeping up slowly—*e.g.*, white softening, or chronic myelitis, or if it depends upon syphilitic meningitis that may have occurred some time ago, and led to some slowly-induced pressure on the cord,—you may, in such cases of partial spinal paralysis, find electricity very useful.

Here it is that I would especially distinguish between the faradic and the battery-current. Where there is wasting of the limb, the application of the battery-current has appeared to me much more efficacious and much less mischievous than the other, when it is applied in the manner I have described. When, on the contrary, there has been no such wasting of limb, it seems to me that faradisation has acted better, faradisation applied with wet sponges, and especially directed to the muscles. If the contractility of a muscle is good, and just in proportion as you find the contractility of a muscle good, your prognosis is bad, so far as electrical treatment is concerned. If you find, for instance, a limb perfectly paralysed, but contracting perfectly well to galvanism, or sometimes acting even in excess, you can do nothing more by applying galvanism to that limb. Your prognosis may, however, be good if you find the contractility diminished, but not lost. If it be wholly lost, the prognosis is bad; if absolutely good, the prognosis is bad; if between the two, it is in proportion to the improvement you can effect in the nutritive condition by one or two applications of the current.

I have to mention only one other point in these cases of spinal paralysis —cases of impotence. These cases are sometimes very much improved by the use of electricity applied in the same manner as for loss of power over the sphincter vesicæ.

9. Now a few words on paralysis from injury to or disease of the nerves —the third group. These cases are distinctly of the same class as those which Dr. Marshall Hall called "spinal paralysis. Some persons have called them peripheral, local, or traumatic paralysis. So far as the contractility of the muscles is primarily concerned, it matters not whether you cut the nerves across or destroy the cord to which those nerves were attached. If you divide a nerve going to a muscle—as, for an example, when the facial nerve is divided by disease in the bone—you have "spinal paralysis" of the facial nerve in the sense in which Dr. Marshall Hall used that word. The severance of muscles from the spinal centre may be complete or incomplete, and you can measure the amount of damage done by the amount of electric contractility that remains. If a muscle or a group of muscles has been for a time completely paralysed by a damage done to a nerve or by neuritis, and yet the morbid state of the nerve was of such kind that it might be repaired, then, although the nerve has recovered, the results of its disuse may remain, and imperfect paralysis may persist. For instance, take this *example*, which occurred to myself not very long ago. A man tried to lift

a heavy portmanteau, strained himself in doing so, had great pain in his arm afterwards, and then most intense, indeed agonising, burning and tingling in the tips of his fingers and palm of the hand. After a time the pain disappeared, and then it was found that his hand was excessively weak and that the muscles were wasted. He had strained his forearm, injured its nerves, and set up some neuritis; but after the neuritis passed away there remained paralysis of the muscles, with wasting, and almost complete loss of electrical irritability. It was not until some time after all these symptoms had occurred that he was treated electrically, and then the difficulty to be contended with was the wasted muscles. In looking at what he could do with his hand, we found that there was every movement of the hand that could be performed; he could bend all his fingers, separate them, and bring them together again; but he could not do this quickly, nor could he do it forcibly. There was partial paralysis of all the muscles of the hand, depending upon damage to the nerve, and also upon consecutive changes in the muscles. Electricity was applied to the forearm and hand, and the muscles soon improved in their nutrition; and with that improvement in the nutrition of the muscles the voluntary power returned. You may find a similar thing, now and then, in the case of facial palsy—paralysis persisting as the result of disease. Examined electrically, you find that there is a certain amount of contractility left, although it is defective. If you apply electricity after an interval of two or three weeks, you may often cure the case by a very few applications; but if the paralysis has lasted for six months, you will find at first very little contractility indeed, and you will have to apply electricity again and again before you obtain any distinct marks of improvement. Sometimes there is slight restoration of voluntary power after even the first or second application, and then the subsequent improvement is very trifling. When the paralysis is imperfect, and the contractility is only diminished, you may accomplish much; but when the contractility has quite disappeared there is little or nothing that you can do. You never can tell, until you have made several applications of the current, whether or not the case is curable, for although a group of muscles may be completely paralysed to the will, there may be some few nerve tubules that have escaped destruction, and their functions may be slowly recalled.

The mode in which you should apply electricity in cases of local paralysis is the following:—Place one conductor, well wetted, over the trunk of the nerve, and the other over the muscles, *seriatim*. If you are using faradisation you may keep the second conductor steady; if galvanism, you must move it about, in order to interrupt the current.

Paralysis of the third nerve, with ptosis or strabismus, may be treated by galvanism or faradism; in either case one pole should be placed behind the ear, in the hand, or on the cheek-bone, and the other should be applied to the lid. A weak current only should be used, and the application should be brief.

In paralysis of the seventh nerve, from simple exposure to cold, the best plan of using electricity is the electric brush. Place a well-wetted sponge behind the ear, and take the metallic brush, and brush it over the skin, so as to sting the face. If it have existed longer, and there be much wasting of muscle, the same rule applies; but here you should also operate upon the muscles; and I would advise you to use the battery-current for a certain number of times, until you find that its power of eliciting contraction diminishes, and then to apply faradisation.

10. And now a word or two about other kinds of paralysis depending more or less on some morbid condition of blood, or nerve, or muscle, or of all these elements together. And, first, let me direct your attention to poisoning by lead.

(*a*) I do not know the precise mode in which lead produces paralysis, or why it singles out particular muscles; but in those muscles which are affected, it is found that there is undue readiness of response to a slowly interrupted galvanic current, and greatly diminished contractility to faradis-

ation and to a rapidly interrupted galvanism. Whatever may be the explanation of these points, remember that it is not simply a question of difference in the kind of electricity applied; for if you rapidly interrupt the battery-current, you find the muscles in lead-palsy do not act to that. The rapidity of the interruption may account for the inaction of faradisation; but why the muscles that are paralysed should act more readily than healthy muscles to a slowly interrupted current has not yet been explained. The mode of treating lead-palsy has been by faradisation, or by the application of the battery-current. You take a current from, say, five cells, apply it to the extensors of the hand, and you produce definite contraction. After a few applications you often find that five cells are not enough, you have to use seven or eight or ten; and in a few weeks of application you have to use quite as many to produce contraction as in a healthy limb. At first they are very sensitive to the battery-current; then gradually, as you apply it, they grow less so, and you then, curiously enough, find them brought back into their normal relationship to faradisation. There is no doubt about the fact that the improvement in nutrition, which seems to be brought about by the battery-current rather than by any other means, entails a loss of the morbid irritability to that battery-current, and with that improvement in nutrition you get a return of the normal contractility. If you have not a battery-current, you may use faradisation to begin with; but if you do, be quite sure that you affect the muscles. I have known patients with lead-palsy treated by having their hands in water and their feet in water while the current is passed from one to the other. Such a proceeding is not of the slightest good. If you were to apply one pole of a faradisation machine to the chimney-pot of a man's house, and the other to his door-step, you would be as likely to get the current into the muscles that you want to benefit. You must apply faradisation locally, with thoroughly well-wetted sponges, and of such low intensity that it is scarcely felt, and yet of sufficient strength for you to be certain the muscles respond. Use it every day, and have particular muscles singled out—just those which are the most paralysed. In these cases it is often difficult to get the current into the limb; and you will find an advantage sometimes in soaking the limb by covering it, for an hour or two beforehand, with wet lint and oiled silk at the spots where you want to apply the sponges. Get the skin well moistened, and the current will pass through more readily.

(*b*) One word about the paralyses that come from anæmia, and are often met with in pale hysterical girls. Some are set down as hysterical without, I think, any just cause; they are more or less dependent probably on an altered blood state, which may affect the cerebral centres, and lead to these peculiar weaknesses. I am quite sure that some of these local paralyses are relieved occasionally by static electricity administered in the mode I have described already, by sparks from the skin, or prime conductor, or by a Leyden phial. One of the forms which anæmic paralysis occasionally takes is that of loss of speech, or change of voice, dysphonia, or aphonia. It is often called hysterical aphonia. It may be hysterical, according to the use of the term by some people, but in many cases it exists quite alone and apart from anything that one ordinarily recognizes as the hysterical temperament. When present there is almost invariably marked anæmia. Here sometimes a few sparks from the prime conductor of a machine will bring the voice back directly. Sometimes, if that will not do, the Leyden phial will immediately succeed, and this after you have applied electricity in other forms without success. A few sparks do not cause pain; but if you apply faradisation to the larynx, you do cause a great deal of pain. It is uncomfortable to have even a weak faradic current passed through the larynx, and it is often perfectly unsuccessful; and yet a spark, which causes no distress, will often bring back the voice at once. In certain cases it is desirable to introduce the current of faradisation right into the glottis; and this is so when there is distinct paralysis of *the vocal* cords. You may see with the laryngoscope that one or the other

cord, or that both cords, are paralysed; and it is quite easy to apply faradisation to the larynx internally in the manner recommended by Dr. Morell Mackenzie. One pole is held in the hand, or applied to the nape of the neck; the larynx is well exposed; and the other pole is carried between the cords by an instrument constructed for this purpose. This is shaped like a catheter, with a small sponge at the end; and this sponge has a wire passing from it inside the catheter up into the handle, which is so connected with a key that you can either make or break the current by pressing on the key. Having placed the sponge in between the vocal cords, you touch the key and send the current through them. Patients will sometimes cry out the moment that the application is made, and you may very easily imagine that they would if they have any crying power left in them. But many patients prefer the internal faradisation of the larynx to the external, affirming that it is the less painful of the two.

11. There are a few words only which I wish to say about local spasms. The forms of spasm in which electricity has been most commonly used are "torticollis," a spasmodic condition of the muscles of the neck on one side; "writer's cramp;" and so-called "histrionic spasm" of the face. It is said that such cases have been cured, but my own experience has been unfortunate with regard to them. I have tried electricity again and again, and in every available form, but have never seen it do any good. I have tried battery-currents, direct and indirect; I have tried faradisation weak and faradisation strong, with wet sponges and with dry; I have used static electricity also, and each form of electricity persistently; I have not given up because the treatment has done no good at first; but I do not know one single instance in which it ever seemed to me to do the smallest good. In torticollis, for the time being, you can put the head straight by either a strong battery-current passed through the contracting muscles, or by faradisation of the other side, the muscles of which are often weak; but directly you cease the application the head goes back again to its abnormal position. I have obtained similar negative results in cases of both writer's cramp and histrionic spasm. Others have been more successful, and I trust that your experience may resemble theirs rather than my own.

12. In painful affections such as the neuralgiæ, migraine, sciatica, tic-douloureux, and the like, and also in some conditions of modified sensibility, such as the spontaneous feeling of heat or cold, the sense of numbness, of tingling, "pins and needles," or such like discomforts, electricity is often of considerable service. It is the continuous galvanic current which you should use, and it should be of only such strength as to be just perceptible by the patient; it should be applied to the part with well-wetted sponges, and should be applied for a short time only, but with frequent repetition. I know of nothing more distinct or more satisfactory in therapeutics than the relief which may often thus be given to suffering of the most intense character, the relief being very rapidly induced, and in many cases permanent. In applying galvanism to the head you must be very careful to avoid using such a strength as to cause vertigo or faintness, and I am sure that you may avoid these evils by trying the current upon your own head first, and then by carefully observing the patient, and stopping the application for a time the moment that there is any complaint, by word, gesture, or look, of any uneasiness in the head or epigastrium.

Electricity is one of the most powerful agents that you can employ in the treatment of disease; but it is useful, useless, or mischievous, according to the manner in which it is applied; and my endeavor has been to furnish you, by means of these lectures, with the information which shall enable you to derive help from it in diagnosis, and confer real advantage upon your patients by rightly directing its therapeutic powers.—*Lancet, July* 23, *Sept.* 3, *and Oct.* 15, 1870, *pp.* 109, 321, 530.

14.—COMPARATIVE VALUE OF THE GALVANIC AND FARADIC CURRENTS.

By Dr. A. D. Rockwell, New York.

Since the time of Remak, the comparative value of the galvanic and faradic currents in therapeutics has excited considerable interest, and at one time was the subject of angry controversy. At the present day all electro-therapeutists who keep abreast of the progress of their department agree that both currents are of service; that one will fulfil certain conditions for which the other is inadequate, and that no one who expects to secure in practice the complete effects of electrization can dispense with either. Concerning the special indications for the use of the one or the other, opinions widely and honestly differ, according to the opportunities and experience of each individual. In Germany, where the school of Remak is dominant, the galvanic is used more than the faradic; in France, at least among the disciples of Duchenne, the faradic more than the galvanic. In England and America both currents are employed, general practitioners using chiefly the faradic, while specialists use both with more or less exclusiveness.

Much of the confusion that exists concerning the differential indications for the use of the galvanic or faradic currents arises from an imperfect or erroneous or exaggerated conception of the distinctions in their physiological effects.

The general belief or supposition is that there is between them a radical and important difference in *kind*, and that an appreciation of this distinction is essential for a knowledge of the differential indications for their use. From the accumulating results of experiment and experience in electro-physiology, diagnosis, and therapeutics, we think that there is strong reason for regarding the essential distinction in the effects of these currents on the body as mainly of *degree*, and that this is the scientific basis for their differential employment.

Thus the galvanic current applied on the face and head produces flashes before the retina, while, as a rule, the faradic will not. We have, however, frequently treated certain sensitive pathological conditions where the same flashes were caused by the faradic. With the improvement in the general condition of such patients, this unusual susceptibility to the faradic influence always disappears. An important peculiarity of the galvanic current is, that when applied on the neck it causes a metallic taste, and yet we have on several occasions treated cases of constitutional neuralgia combined with excessive irritability, where the same effect was markedly and even unpleasantly produced by the faradic current, when applied above the seventh cervical vertebra. Other well-recognized peculiarities in the effects of the galvanic current, distinguishing it from those of the faradic, are *giddiness* and *vertigo*, when applied on or near the head, *diplegic contractions* and special sensations down the upper extremities and over the body, when applied to the cervical sympathetic; marked chemical effects, especially when used in large quantity, redness and burning sensations of the skin at the points on the surface where the electrodes are applied. All of these effects are observed in a less degree from the faradic current, and some of them in cases of great abnormal sensitiveness are very decided. When we come to study their therapeutic effects, we also find that both currents differ chiefly in degree. In the form of localized electrization, both can produce muscular contractions in paralyzed muscles and relieve local neuralgia; both cause absorption of abnormal secretions, and both can directly affect the brain, spinal cord, sympathetic, and all the internal organs, producing in different degrees, the various therapeutic results that directly and indirectly flow from electrical excitation of these parts. In the form of general electrization both currents, besides producing most of the results of localized electrization, act as powerfully stimulating tonics, and thus form most efficient aids in the relief and cure

of nervous exhaustion, nervous dyspepsia, constitutional neuralgia, and of a wide range of nervous diseases associated with or dependent on general debility.

In electro-surgery both currents avail to discuss tumours, heal ulcers, and hasten absorption, although the galvanic current, when used in large quantity, produces cauterizing effects to which the faradic is unequal. And yet the difference in *degree* between the effects of the two currents is so marked and so clearly demonstrable as to be practically equivalent in certain instances to a difference in *kind*, and to give very important and remarkable advantages to one current or the other, according to the indications offered.

Advantages of the Galvanic over the Faradic Current.—The advantages of the galvanic over the faradic current are :—

1st. *A greater power of overcoming resistance.*

It therefore affects the brain, spinal cord, and sympathetic more powerfully than the faradic, since the anatomical position of these parts is such that considerable resistance must be overcome in order to directly affect them.

For the same reason it is usually to be preferred when it is desired to affect the middle and internal ear, the retina, and the muscles of the eye.

2nd. *A power of producing muscular contractions in cases where the faradic fails.*

This peculiarity of the galvanic current has been observed so frequently, and in such striking instances, that it has become an accepted fact of electro-therapeutical science.

After a certain amount of treatment by the galvanic current, the paralysed muscles frequently resume their susceptibility to the faradic.

3rd. *A different and far more potent chemical action.*

The chemical power of the galvanic current is most markedly seen when used for the purpose of galvano-cautery, or "galvano-caustic chemique."

In order to produce the energetic caustic effects of the galvanic current, it is necessary to use elements that generate quantity of electricity, and to combine them in such a way that the quantity produced shall be very large, since an ordinary single element, or indeed a large number of elements arranged for intensity, exhibit only a comparatively feeble cauterizing effect. It is because the galvanic current can be thus arranged for quantity, more than in any difference in kind between the effects of the two currents, that it has so marked and peculiar a superiority to the faradic as to practically amount to a difference in kind. The quantity of the faradic can be but slightly increased, and hence, although it does possess some chemical virtues and produces slight chemical effects, it is not indicated where such effects must be very energetic or concentrated. The superior efficacy of the galvanic current to the faradic, so often observed in the treatment of neuralgia, of atrophied muscles, rheumatism, &c., is probably due to its greater chemical or catalytic action. It probably induces more rapid and more important molecular and other changes in the tissues.

Advantages of the Faradic over the Galvanic Current.—The advantages of the faradic over the galvanic current are these:—

1st. *By virtue of its frequent interruptions it more easily produces muscular contractions when passed over the muscles or the nerves that supply them.*

In order to produce muscular contractions with the galvanic current, it is necessary to interrupt the current, and, unless it is quite powerful, to localize at least one of the electrodes over the motor nerve by which the muscle is supplied. On the contrary, the faradic current is in a condition of rapid interruptions, and produces contractions when indifferently passed over the surface of the muscle, as well as when localized on the main motor nerve that supplies it. This advantage of the faradic current is best appreciated in *general electrization*, the powerful tonic effects of which are partly and quite largely due to the passive exercise, and consequent important changes of tissue that result from the several thousand muscular contractions that take place during an ordinary sitting. In localized electri-

zation this advantage is not so clearly or strongly marked, since in this method, by a proper knowledge of electro-therapeutical anatomy and sufficient care, it is possible to direct one of the electrodes on the motor points; and yet even here the faradic current is much more convenient, because its employment requires no arrangement for interruptions and less minuteness of attention to the situation of the "motor points." The exceptional cases of paralysis, where the muscles have lost their susceptibility to the faradic current, do not interfere with the general rule.

2nd. *It is less likely to produce unpleasant or harmful effects than the galvanic.*

In certain acute and chronic pathological conditions, where it is desirable to produce a decidedly stimulating effect without marked catalytic action, the faradic current can alone be used with benefit and safety. To confirm this statement, we rest mainly on the evident results of clinical observation. We recall at least two cases of severe neuralgia of the trigeminus, where a mild and rapidly interrupted faradic current, applied on several occasions, relieved the pain very decidedly.

In order to hasten recovery, the constant current from but four of Bunsen's cells was for a moment directed along the course of the painful nerve. In both instances the neuralgia immediately returned with increased severity, but was relieved a second time, and soon recovered under the influence of the current first named. We may indeed refer to a number of cases of severe constitutional neuralgia and excessive nervous exhaustion where the faradic current invariably relieved, and where the galvanic as invariably aggravated the symptoms.

Our own experience teaches, that wherever the constant current can be used without injury, there also will a faradic current of relative intensity be harmless. It teaches further, as above stated, that in certain conditions where the faradic current is not only harmless, but of decided benefit, the galvanic, even when its tension is very slight, may occasion evil results.

Galvanization of the Sympathetic.—One of the most important advantages possessed by the galvanic over the faradic current is the readiness with which the former affects the sympathetic.

The attention of the profession was first called to this fact by Remak, who observed the occurrence of diplegic contractions when the superior cervical sympathetic was submitted to the influence of the constant current.

This observation of Remak was confirmed by Fieber, who produced similar phenomena in the living animal by exposing the sympathetic and directly galvanizing it.

It does not come within the scope of this short paper to theorize at length concerning the beneficial results following galvanization of the sympathetic.

In those cases of paralysis of vaso-motor nerves and arterial spasm that are benefited by this method of treatment, the favourable results may be ascribed in brief to the influence exerted on the vaso-motor nerves.

The few following cases may serve to illustrate some points in the above remarks :—

Case of Persistent and Excessive Nausea.—Recovery follows Galvanization of the Sympathetic.—Mr. H. S., a tall spare man, aged 49, was the victim of a mild form of nervous dyspepsia, from which he had suffered slightly for many years. Some three years since, a very annoying symptom supervened. Every morning soon after breakfast he observed a feeling of nausea that lasted a short time and then passed away.

This symptom gradually increased in severity and duration, until it became most distressing, and for more than two years no form of medication had afforded more than temporary relief. We first made use of the faradic current by the method of general electrization, directing the applications more especially to the back of the neck, so as to affect, as far as possible, the sympathetic. As no relief followed, we resorted to the galvanic current, applying the positive pole at the inner border of the sternocleido-

mastoideus muscle, and the negative at the sixth cervical vertebra, and allowed a mild uninterrupted current to pass for three minutes. By this method the sympathetic was decidedly influenced, and relief was afforded. Succeeding applications gradually reduced the intensity of the nausea until the tenth séance, when it disappeared completely and has not since returned.

Case of Disordered Nervous Action relieved by Galvanization of the Sympathetic.—Mr. H., aged 40, complained of an unpleasant feeling of constriction in the throat, and a constant pricking or tingling in the arms and hands. The patient, who was of a highly nervous organization, stated that these symptoms had existed for a number of years. During the last few months, however, they had become so decidedly aggravated as to excite alarm, and impelled him to seek professional advice.

A number of general applications with the faradic current were administered without special result. We then resolved to influence the sympathetic by the galvanic current.

The first application to either cervical sympathetic excited a decided perspiration in both axillæ and along the inner side of the arms. The symptoms of which he complained became rapidly less marked, and after twelve applications ceased to annoy him.

Patients suffering from cerebral effusions frequently speak of an unpleasant roughness in the eye. This symptom may probably be ascribed to dilatation of the smaller blood-vessels through weakness of the vasomotor nerves. We have found that this condition is almost invariably relieved by galvanization of the cervical sympathetic.

An aggravated Case of Chorea resists the Action of the Galvanic, but yields to General Electrization with the Faradic Current.—The little patient in whose case the results of treatment by the faradic current were so gratifying, was under the professional care of Dr. J. O. Farrington.

Dr. George T. Elliot was called in consultation, and by these gentlemen electricity was advised.

Some two months previous to the consultation certain abnormal movements—such as starting suddenly to his feet, throwing out a hand, or a foot, &c.—were observed by the teacher of the boy. Two weeks subsequently, the patient was seized with well-marked choreic symptoms of the right side of the body, and in two days the disturbance extended to the opposite side. So constant and violent were the movements of his arms and legs that it was impossible to keep him on a bed or sofa. It was necessary to place him on the carpet, surrounded by inflated rubber bags. Intelligence seemed to be perfect, but the power of speech was lost, and the sufferer made known his wants by impatient cries and ill-directed motions.

Sleep was impossible without the nightly administration of an opiate. Contrary to our judgment, but by suggestion, we commenced treatment by the use of a mild galvanic current directed especially to the base of the brain and the spinal tract; but this method served only to aggravate the child's condition. We then resorted to the faradic current by the method of general electrization, but so violent were the involuntary movements in the limbs and body of the patient, that it was with difficulty that he could be held in a sitting posture and his feet kept on the copper plate to which the negative pole was attached. The applications were *general*—every portion of the body, from the head to the feet, being influenced on each occasion.

Improvement was manifest from the very first. He was at once enabled to sleep soundly, although his opiate was reduced one-third, and after the fourth application it was dispensed with altogether. In the course of three weeks, during which time fifteen applications were given, the case was so far improved that the patient was able to utter distinctly words and sentences. The choreic symptoms were so much diminished that the boy could readily sit quiet and alone, and during an application was able to command the movements of his body and feet. Improvement continued

during the administration of a few more applications, when the child was taken to the sea-shore, where in two weeks he quite recovered. Some three months since, after having enjoyed excellent health for a year and a half, the boy suffered from a second attack. He was immediately subjected to the influence of electrization, and recovered even more rapidly than before.—*New York Medical Record, June* 1, 1870, *p.* 152.

15.—CASES OF NEURALGIA.

From a Report of Practice at the Royal Infirmary, Edinburgh.

Case 1.—*Neuralgia of Supraorbital Nerve: Division of Nerve: Recovery.*—W. D., aged 40, a gamekeeper, was in other respects a healthy man. He had suffered from tic in the jaw for five years. The pain during that time, although not constant, had occurred in paroxysms almost daily, and was usually very severe. Commencing at the supraorbital foramen, the pain passed downwards over the right cheek and upwards to the forehead; and for some months past it had been of a most excruciating lancinating character. He had been treated by many of the most skilful practitioners with almost every conceivable remedy for the affection, both internal and external, including quinine, iodide of potassium, mercury in large and small doses; purgatives of all sorts, such as croton oil; liniments of every description; chloroform, blisters, opium in all shapes, endermically and hypodermically; aconite, iron, bebeeru, etc.; but all without relief.

Upon examination, the teeth were found all sound. The pain was daily intense, and lately had become so agonizing that the general health was beginning to suffer. As the patient was willing to submit to any measure likely to procure relief, the following operation was performed.

Dr. Joseph Bell made a T-shaped incision over the supraorbital foramen, and exposed the nerve. A portion of this, about the third of an inch in length, was excised. On coming out from the effects of the chloroform, the patient stated that the neuralgic pain had disappeared; and from this time till the present it has never returned. He was discharged from the hospital about a week afterwards, perfectly well, and without having experienced the slightest twinge from the pain from which he had been suffering for so many years.

In connection with this case, Dr. Joseph Bell remarked that in his experience the above result, with a few exceptions, generally followed division of the nerve in this affection; the recovery, however, being only temporary. The patient, he says, usually remains perfectly free from suffering for three or four months, after which time the pain gradually returns, and the operation has again to be performed, with a like result.

Case 2.—*Neuralgia of Dental Nerve, treated with Hydrate of Chloral: Relief.*—J. F., aged 65, had, for the last six months, been suffering from neuralgia of the dental nerve of the right side. The pain was intense, occurring in paroxysms almost hourly, and shooting downwards in a lancinating manner throughout the entire course of the dental nerve. For the relief of this, nearly all the teeth of that side had been removed, and all the ordinary remedies, both internal and external, had been employed without effect. On admission, he was suffering the most intense agony, and he was emaciated and careworn from constant suffering. Hypodermic injections of bimeconate of morphia and atropine, with bebeeru, quinine and iron internally, were administered without any beneficial effect. It was determined to give the hydrate of chloral a trial. Forty grains were taken in the morning. In the course of ten minutes, the pain began sensibly to diminish, then gradually continued to decrease in severity, and in ten minutes more altogether disappeared. During this time he had not the slightest desire to sleep. The patient remained in perfect comfort for about half an hour, at the end of which time the neuralgia again gradually returned. Another dose of the medicine produced the same relief, which,

however, never lasted more than about half an hour. This experiment was frequently repeated, and always with similar results; but it was remarked that in the course of a week the chloral, even although the dose was greatly increased, seemed to lose this anodyne effect, and did not relieve pain without causing sleep. As a commentary upon this case it may be stated that, after all the ordinary remedies failed to remove this distressing symptom, chloral produced temporary relief. The remarkable feature, however, is that chloral, contrary to the general opinion of its action, seemed to produce in this instance a true anodyne effect, viz., the relief of pain without causing sleep. That this was not altogether a coincidence, was shown by the repeated observations made upon the case, the administration of the drug always being followed by temporary cessation of pain. Lastly, it would appear that here chloral lost its effect upon the system; as, to produce in this man beneficial results, the dose had to be gradually increased; and, finally, although he took so much as seventy grains, no anodyne action followed.—*British Medical Journal, May* 21, 1870, *p.* 519.

16.—SCIATICA: ITS TREATMENT BY ELECTRICITY.

By Dr. Henry Lawson, Assistant Physician to St. Mary's Hospital.

[This article may be considered supplementary to the one in our last volume, at page 44.]

Of the forms of dynamic electricity, that which is most often, though not most scientifically applied, is the faradic. Farady's machine—the induction coil—enables a small battery (a single Smee's or bichromate cell) or an arrangement of magnet to develope a very intense electric vibration, the power depending on the length and character of the wire in the coil—which, however, has these peculiarities; firstly, each individual vibration is momentary, and each succeeding one differs, as to the direction in which the current passes, from its fellow.

By the induction coil, we are enabled to produce a series of rapidly successive currents of a force (therapeutically speaking) which can be graduated by means of a contrivance that practically reduces the extent of the coil.

This used to consist in withdrawing the soft iron bar from the coil, and now consists of a tube of copper closed at one end, and which, sliding over the coil, allows us to bring as much or as little of it into action as we please. It will be well, then, to bear in mind, that whether we use what is called a volta-induction coil, or a magneto-induction coil, we are in each case employing faradisation, and that while applying the instrument, we are causing two currents passing in opposite directions, and rapidly alternating with each other, to traverse the parts of the patient included between the two poles.

Now, there is a further point in regard to the application of faradisation, which is of importance in the treatment of disease. It is a matter of considerable moment how the electricity is applied, It may be so contrived, as that the current is, so to speak, split up, and distributed over a considerable surface, or caused to penetrate the skin, and then affect the muscles. My experience of faradisation in sciatica leads me to oppose very decidedly the use of the ordinary conductors—the brass tubes filled with moistened sponge. When in a case of severe sciatica, a case in which locomotion has become painful, and the limb is kept constantly flexed, faradisation is used in this way, the result is most baneful. The (in both senses) irritable muscles are according to the strength of the current, thrown into violent contraction, and the patient is left in excruciating agony for several hours after the operation. The only—so far as I know—admissible method of applying faradisation in sciatic cases, is that in which a good sized pair of metallic brushes (such as are now sold with every Medical induction coil)

are employed as conductors; these so distribute the current as to affect but slightly the subjacent muscles, while they produce a great deal of surface-irritation and hyperæmia. As to the extent of the coil to be used, or in other, and more popular language, the strength of the current to be administered, that must be absolutely left to the discrimination of the operator, who should invariably begin with a feeble current, and increase it gradually up to the point of endurance on the part of the patient. Some persons have an epidermis highly sensitive, while others have a skin which contains such a mass of corneous non-conducting material, that it may fairly be called a hide. In no case should the application be persisted in for more than ten minutes at a *séance*, and though in course of time it may be used three times a day, it will be advisable to limit the application at first to once in the twenty-four hours.

A great deal is said and written about the part to which the positive and negative poles are respectively to be applied. I must say I think there is nothing to warrant the belief that there is—in cases where metallic brushes are used as conductors, the least difference therapeutically whether the positive pole is placed in one position or another. I am disposed to think that the same holds good too in regard to application of faradic electricity in all cases, but of this I shall say more on another occasion. It seems to me therefore (but I shall be glad to know the opinions of those of my professional brethren who have considered the subject on this point) that the medical man who is about to apply faradic electricity to the treatment of sciatica, need not trouble himself about either primary or secondary currents, or about positive and negative poles, but need simply apply the brushes to the limb in the following manner: The brushes should have the wires expanded fanwise. Then, one being placed above, near the sciatic notch, and the other at about the junction of the middle and lower third of the thigh, in the direction of the sciatic nerve, one brush should, while firmly pressed against the skin, be made to approach the other, either being kept fixed. After a few brushings the local effects will exhibit themselves, and the application should then be suspended.

It may, perhaps, appear singular that I should have entered into such details concerning a therapeutic method which I cannot hopefully recommend in the cure of sciatica, but it is, nevertheless, true, that my opinion of faradic electricity in these cases is that it may be either extremely injurious or very slightly beneficial. Ere I had learnt practically the sad consequences of applying the induction current so as to contract the muscles, I tried this mode only. Subsequently I employed the plan already stated. The result was generally *nil;* but in some few cases, just those kinds in which liniments proved useful, it was alleviative. Still, as I doubt not that electricity will be one of the great medical engines of the future, I have thought it right to say all I had got to say on the subject even of faradisation.

Galvanisation or the use of the continuous galvanic current has long been used, and with varying success as to the treatment of sciatica. Remak spoke of the result of this mode of treatment in such laudatory terms that his cures appear to have been little short of miracles. Other therapeutists, and among them not a few English physicians, have also tried galvanisation but they have not reported so favourably of its effects. I have experienced the effects of the continuous current myself, and I have watched its results in some of my patients, and I am prepared to say that we have in galvanism a remedy which, under other conditions than those under which it is now employed, will prove most valuable in the future. I do not in the least doubt the pain-relieving power of the current from the galvanic battery. I have felt it in my own case and have seen it in the case of patients, but I must also say that the difficulty of applying the current, owing to the densely non-conductory character of the skin, the troublesome nature of the operation, the almost impossibility of keeping up a constant current for months, and our ignorance of the relative physiological merits of what are called intensity and quantity, and of the therapeutic

difference between a single huge cell with large surface and a large number of small cells, all render the employment of galvanism in an affection like sciatica more interesting to the scientific physician than beneficial to the patient. I would not have it supposed that I deny galvanism to be a remedy in so-called rheumatics, but when we have—as in hypodermic injection of morphia—a safe, certain, rapid, and convenient remedy of another kind, we must not resort to one which, however attractive to the therapeutist, is really of not much practical use to the patient.

I shall not attempt the herculean task of describing the various forms of galvanic batteries now in use, but would merely remark that, besides the ordinary combination known as Daniell's, of which from 70 to 100 cells are generally employed for medical purposes, several convenient forms, consisting of fewer cells of much greater individual intensity, have of late been offered for sale by the English instrument makers, and in the present phase of electro-therapeutics, the physician must absolutely be left to his own choice. Some are in the habit of attaching a galvanometer to the battery, and I believe that of these not a few imagine this apparatus to be a sort of guage of the therapeutical strength of the combination, this being they fancy, indicated by the deflexion of the needle. It is needless to tell the student of *physics* how absurd is any notion of this kind, but it is necessary to inform the student of *physic* that in electro-therapeutics the galvanometer is of no real use. We want some handy means of estimating the exact intensity and quantity of the current at any time produced by our batteries, but, unfortunately, the method which can be used for one of these purposes is too complex for medical practitioners. The physician's best guide, though it is at most an inconstant one, will be the sensation produced when one pole is placed in the hand and the other is brushed lightly along the skin of the wrist.

In applying the galvanic current, the patient should recline on a couch, with the hip and outer side of the affected limb exposed and upperm ost. The sponges of the conductors being then moistened, one should be applied to the skin just above the point of exit of the nerve from the trunk, and the other over the seat of the nerve at about the commencement of the lower third of the thigh; if the skin be, as it often is, of a tough character, it will be well to apply for twenty-four hours previously, a small cold-water dressing over the parts against which the poles are pressed. By this means the skin becomes saturated with water and is thus made a better conductor. But it may be asked, does it matter whether the positive pole is placed above or below? and this is, of all questions in electro-therapeutics, the one, perhaps, that on which the evidence forthcoming is least satisfactory, owing to the way in which the experiences of different workers conflict. My knowledge is certainly a very limited one, which I hope to enlarge now that an electrical room is about to be established at St. Mary's Hospital, but so far as it extends it teaches me that the inverse, and not the direct current, is the one which produces most relief in cases of sciatica. The galvanic current being supposed to travel from the positive towards the negative pole, we may roughly define the inverse current as that in which the current is supposed to travel towards the central nervous system, and the direct, that in which it travels towards the periphery. Now, when first I applied the galvanic current, I imagined that the most natural method was to apply the positive pole near the root of the nerve, and the negative below. My readers will then judge of my surprise when I found that this plan, both in my own case and in that of others, while it apparently gave some ease during the operation, appeared to intensify the pain for hours subsequent. I next adopted the inverse current; I placed the positive pole below and higher up, and the negative on the skin near the exit of the nerve, and I found that this resulted in the production of more ease than any other plan. Now, why this should be, must, I fear, in the existing state of therapeutics, remain a mystery, but I am disposed to regard it as a fact, and I shall be very glad if some of my readers will give the plan a fair trial, and

will communicate the results to these pages. I am aware that Remak gives very elaborate instructions as to the conditions under which the negative pole is to be applied to the painful point, but no one, I venture to say, but Remak himself could have estimated these conditions properly.

As I have already stated, the relief afforded by the continuous current, whilst it is unquestionable and immediate, is neither of long duration nor of great extent. For some few hours the limb feels somewhat "deadened," so to speak, and the suffering is certainly more tolerable, but this condition of things does not last long, and the pain is even under the best circumstances not entirely banished. If the hypodermic injection could not be employed, then I should say that our most useful remedy for sciatica was the galvanic current, but when I compare the two plans, when I think of the difficulty, nay the almost impossibility of administering electricity at the patient's residence, and of the tedious character of the operation, and when, on the other hand, I know how sure, safe, and expeditious is the subcutaneous remedy, I am bound to say that galvanism, while it should still be used (in special cases), is really of little value in the great majority of cases of so-called rheumatics.—*Medical Times and Gazette, July* 30, 1870, *p.* 120.

17.—ON THE TREATMENT OF SCIATICA.

By Dr. J. Waring-Curran.

[Hypodermic injection of morphia is a wonderful remedy in sciatica, but unfortunately the pain often returns with increased severity as soon as the effects of the morphia pass off. For some years Dr. Curran has employed the following treatment, and he states that it is safer, surer, and more satisfactory than any treatment or method of treatment he has anywhere observed.]

In a small porcelain vessel I mix one grain of morphine and three grains of extract of belladona with six drops of creosote. I get my patient out of bed, standing as erect as the nature of his disease will permit him, and began making small incisions, half an inch long, with an intervening space of three inches between each incision, cutting only through the skin and subcutaneous cellular tissues. I make the incisions alternate on each side of the nerve, beginning underneath the fold of the *gluteus maximus*. Having wiped off the effused blood, I quickly rub in the composition. The morphine and belladonna allay the pain, and the creosote sets up, if properly applied, a certain amount of local irritation, which is very desirable. M. du Chaillu, in his exhaustive and popular work on the gorilla, records a somewhat similar procedure existing among the Celond races. If my memory serves me, caustic lime is the agent he records as being employed.

To every patient suffering from sciatica, I exhibit iodide of ammonium, and I have remarked, as I hope soon to show, that its therapeutic power is superior to the iodide of potassium, but in no complaint will this be appreciated more than in the *eruption* stages of syphilis and in diseases of the glandular system. The patient bent double with acute pain, will be found after the incisions are made and the morphine composition rubbed in, able to move his leg freely in any direction. There is, of course, a numb feeling experienced, but the liberation from acute suffering provokes an expression of gratitude, which is conclusive evidence of the value of the plan of treatment advocated.—*Medical Press and Circular, April* 20,1870, *p.* 310.

18.—NEURALGIA OF THE WALLS OF THE CHEST.

By Dr. John Chapman, Physician to the Farringdon Dispensary.

Writers on neuralgia usually advert to neuralgic affections of the walls of the chest under the names of pleurodynia, inframammary pain, and intercostal neuralgia; but, excepting angina-pectoris, neuralgic affections of the

thoracic viscera are not often systematically or distinctly adverted to. They are, however, in my opinion, of frequent occurrence, and it is more vitally important to detect and arrest them than any other forms of the malady. No physician who carefully studies the variations in the vascular condition of the thoracic integuments of persons in whom the nervous system is liable to disorder by slight causes, can fail to be struck by the fact that the surface of the chest, and especially of the mammæ, exhibits great and often rapid changes of temperature, frequently associated with more or less congestion, and with tenderness, considerable pain being produced by slight pressure. In such cases the patients frequently complain of a dull aching pain within the chest, generally beneath the clavicle—sometimes on one side, sometimes on both. But the most careful examination by means of percussion and the stethoscope fails to elicit any evidence of *structural change*—a phrase denoting, as ordinarily understood, change of a more or less gross and palpable character; but though the ordinary method of physical exploration of the lungs fails in the cases in question to reveal any structural change, I have no doubt whatever of its existence, and feel assured that it consists in the initial stage of conditions too often ultimately appreciable by the stethoscope—viz., disordered nutrition in the form of anæmia, hyperæmia, or congestion. Those primary vaso-motor nerve centres which preside over the blood vessels of the chest walls are also intimately related functionally to those of the lungs themselves; and careful observations many times repeated have convinced me that the temperature and vascular condition of the thoracic integuments at any given time are reliable indices of the state of circulation within the nutrient vessels of the pulmonary tissue.

Persons complaining of pain in the chest, but in whom no structural cause for it can be found, often exhibit those irregularities of circulation, and consequently of temperature, in the thoracic integuments which I have just mentioned; and I have satisfied myself that those irregularities and that aching of the lungs occurring simultaneously, are induced by nervous agency: the morbid influence originating in various remote causes—sometimes within the body, sometimes without—is reflected by the vaso-motor nerve centres on to the blood vessels, causing different disorders of the circulation; and, not infrequently I apprehend, sensory nerve centres related to the lungs are rendered hyperæmic in the manner already described, and become productive of pain referred to some part of the chest. I am acquainted with two cases in which sewing speedily induces chest-ache, and with another in which playing the piano does the same.

When adverting hereafter to uterine neuralgia, I shall mention some analagous facts illustrative and confirmatory of what I have just said. The character of the pain experienced in these cases differs greatly in different persons. It is sometimes dull and peculiarly depressing, accompanied with a feeling as if the chest were constricted, or subject to powerful external pressure; sometimes it is gnawing or burning, and sometimes as if a hot iron rod were fixed within the affected part. A copious secretion of bronchial mucus, often so copious as to be fitly designated bronchorrhœa, is a not infrequent symptom in such cases, and even pulmonary hemorrhage may sometimes occur. Patients suffering in this way are of course apprehensive that their sufferings denote the existence of grave structural injury within the chest, but their ordinary medical attendants finding no physical signs of pulmonary disease, and finding, moreover, that the pulmonary pain is occasionally associated with acute pain in the arms—now in one arm, now in the other, and sometimes in both—ascribe the symptoms in question to rheumatism or hysteria. But notwithstanding the assurances of the physician that there is no cause for anxiety, the patient continues to feel the reality of the pain complained of; and if the vaso-motor nerve centres are extensively and persistently irritated so as to become permanently hyperæmic, there will be slow wasting of both the thoracic integuments and of the lungs themselves. The lungs will contract, the chest walls will sink inwards, the voice will be more or less suppressed, the strength will decline,

and the symptoms of pulmonary consumption may be so well simulated, that both the patient and her friends (in these cases the patient is generally feminine) feel assured that she is the victim of that disease, notwithstanding the fact that the several physicians who may have been successively consulted declare that her lungs contain no tubercular deposit. Indeed, I believe that such cases do occasionally prove fatal, and I entertain no doubt but that acutal phthisis is often inaugurated by and developed out of, the morbid conditions here described.—*Medical Mirror, Sept.* 1, 1870, *p.* 169.

19.—ON NEURALGIA OF THE LEG AND FOOT.

By Dr. JOHN CHAPMAN, Physician to the Farringdon Dispensary.

The ordinary neuralgic affections which occur in the leg and foot usually present no features requiring special comment. The pains are prone to be peculiarly vagrant or mobile, but according to my observations their most favorite seats are the heels, ankles, and toes. Sometimes the affected part of the foot is slightly swollen, red, and hot. Generally, no local change is observable; occasionally, the pain is associated with marked coldness of the feet. Pain in the sole of the foot, sometimes of an excruciating kind, has been described by a few authors under the name of plantar neuralgia. I have frequently met with it as a fugitive trouble, but never as an abiding malady. Although neuralgia of the leg and foot may be and often is restricted to some one spot, generally it is not so, but flies from part to part, and is associated with neuralgia more or less fixed and intense in the upper part of the limb. Of course, if the pains are seated chiefly along its inner side, we are justified in inferring that the lumbar segments of the cord are morbidly affected, and we may find tenderness on pressure of the lowest dorsal spinous processes; whereas, if the pain pervades principally the outer, posterior, or plantar surface of the limb, we know that the branches of the sciatic nerve, and therefore the sacral segments of the cord are chiefly involved. But there are doubtless many cases in which the nerves distributed to the leg and foot from both the lumbar and sacral portion of the cord are the media of pain at one and the same time.

Knee-ache.—Having already adverted to crural and sciatic neuralgia, each of which includes pains in the knee, as well as in the leg and foot, I lay myself open to the charge of repetition by troubling the reader with the following remarks on the special neuralgic affections of the knee. But as neuralgia of the knee, and often of the leg and foot, cannot be referred either to the anterior crural or to the sciatic nerve exclusively, it seems to me expedient to treat of these maladies separately.

The knees receive a very great amount of nervous influence, which reaches them through several channels and from different sources. Nearly all the segments of the cord from the first lumbar downwards contribute to their innervation, which, however, is mainly effected by the lumbar portion. Branches from the external cutaneous, the obturator, the anterior crural, and the internal saphenous nerves, as well as branches (usually three) from the great sciatic cluster about and animate those important parts of the locomotive organs. It is, therefore, to be expected that the knees should especially become seats of suffering; and though knee-ache, or gonalgia, is not specially described in treatises on neuralgia, it is undoubtedly a neuralgic affection extremely common and extremely distressing; but as its victims are for the most part women who evidently hold it to be a part of woman's lot to bear an immense amount of pain, and therefore suffer in silence, little is heard of this form of neuralgia. As a matter of fact, however, the suffering incident to a large proportion of uterine maladies, especially those in which dysmenorrhœa is a prominent feature, is aggravated by aching of the knees; sometimes the pain, which is generally of a dull and diffused kind, pervades both alike; sometimes it is *much more* intense in one than in the other. Habitual sufferers from this

affection are mostly troubled with it at their catamenial periods, and remain wholly free from it during the intervals. There are, however, many cases in which one knee only is affected, and in which the pain recurs quite independently of the menstrual functions. Not long ago I was consulted respecting a case of this kind. The patient, a lady, suffered excruciating pain in one knee, in which there was no so-called "structural disease." But during the access of extreme pain, which was paroxysmal, with intervals of almost complete relief, the surface of the joint became hyperæmic, red, and tender, and the joint itself, though not thickened so as to lose its normal outline, was distinctly swollen and puffy. It also exhibited at different times an appreciable variation of temperature. It was hot during the paroxysms, and cool during the intervals. In many cases of the kind previously adverted to, this variation of temperature is very striking; but in them the decrease rather than the increase of heat is most notable, the knees being as cold as are the feet of those patients who habitually suffer from coldness of the lower extremities. Very often when aching and coldness of the knees co-exist, these are associated with remarkable instability of circulation in the vaso-motor nerve centres, and a consequent habit of alternate shivering and flushing, which are inducible by astonishingly slight causes. If it be true that pain in the knees is possible only by virtue of a modification of condition in those nervous centres to which the nerves just enumerated are related, it is obvious that only such treatment as is capable of affecting the state of those centres is likely to cure the malady in question. Before determining in cases of knee-ache what treatment shall be adopted, care must of course be taken to distinguish pain which is ordinarily understood as neuralgia, from pain in the knee originating in and reflected from disease of the hip-joint. But even the reflexion of this pain may, I apprehend, be either prevented or lessened by the proper use of the spinal ice-bag.

Sir Benjamin Brodie found that a fifth part of all the women who consulted him on account of pains in the joints were suffering from what he considered to be hysterical arthralgia. Of course in many of these cases the knee was the part affected. Now I do not hesitate to express my decided opinion that in proportion as our knowledge of the physiology and pathology of the nervous system increases, that extensive region of disease called hysteria (an admirable disguise of conscious ignorance in the garb of occult wisdom) will be gradually appropriated by science, and allotted in separate sections, according to their special characteristics, to the different departments of intelligible neuro-pathology, so that at length hysteria, as a generic name of an extensive group of diseases, the true nature of which has until this day been either unknown or misunderstood, will be banished from nosography. Hysterical disease of the knee-joint will be translated,—a morbid affection including hyperæmia of either the lumbar, or sacral segments of the spinal cord or of the whole together. In the excellent article on Hysteria contributed by Mr. Savory to the "System of Surgery," edited by Mr. Holmes, the author describes "hysterical" disease of the joints; but in doing so he does but depict with admirable fidelity cases of neuralgia the pathology of which has been fully explained in the preceding pages. "A girl," he says, "will complain of severe pain and tenderness in the knee. The joint is fixed and immoveable, and any attempt to move it elicits loud cries. But the tenderness is excessive and superficial, so that she complains more when the skin is touched than when the heel is pressed upwards. There is frequently, too, a tendency to spasm; but this is different from the painful and involuntary startings of the limbs at night in the real disease. Often also the leg is fixed in the extended position, whereas in real disease of the joint it is generally bent. However, to this rule there are abundant exceptions. The joint does not undergo any material alteration in size and shape, although there is often some degree of fullness—a puffy swelling. In some cases the enlargement may be considerable; but when this occurs it is due to some local applications which have been previously employed. The joint and indeed the

whole limb, is very subject to frequent variations in temperature. Thus, in the morning the limb may be cold, and of a pale or purple colour, as if there were scarcely any circulation of blood in it; while towards afternoon it becomes warm, and in the evening is actually hot to the touch, with the vessels turgid and the skin shining. Moreover, there is always a sense of weakness in the limbs, which after a while is partially due to the condition of the muscles consequent on their inaction. Then there is absence of constitutional symptoms. Although the sleep may be disturbed, and the patient watchful, there is not that almost entire absence of it which is so serious a feature in destructive disease of the joint. There is here a sufficient proportion of sleep for the necessities of the system. All this having existed without any material alteration for some time, with perhaps general debility or some local disturbance, proves the affection to be hysterical."

Cramp of the Leg and Foot.—The most general and characteristic pain experienced below the knee is that accompanying cramp of the muscles of the calf; and when it is borne in mind how considerable are the sources of irritation in the pelvic viscera, and that all irritation arising in them is liable to be reflected downwards through motor nerves originating in the lumbar or the sacral segments of the cord, as well as to produce consciousness of pain referred to the peripheral extremities of other sensory nerves, the frequent occurrence of cramp in the muscles of the lower extremities is easily intelligible. But why the sural muscles are much more frequently affected with spasm than are the other muscles of the limb is, perhaps, not so easily explicable. I am disposed to believe, however, that the cause of the phenomenon lies in the fact that the immensely powerful muscles of the calf are less completely counterbalanced by antagonistic muscles than are any other considerable muscles, either in the lower extremity or in other parts of the body. During sleep, when the action of the will is suspended, and the automatic or purely excito-motor nerve-force has free play, any morbid irritation converging in the sacral segments of the spinal cord is likely to be reflected on the several muscles of the limb in quantities proportionate to their size and the amount of their innervation. As the muscles on the anterior part of the leg are, in respect to size and strength, far inferior to those forming the calf, they cannot, unless we aid them by standing upright, maintain the foot equally balanced between them and the sural muscles, and thus at a right angle with the leg. There is a like but less remarkable preponderance of the muscles in the sole of the foot over those on its dorsal aspect. Indeed, this disposition of the muscles of the leg and foot is analogous to that of the muscles of the forearm and hand, the flexors of which far exceed their corresponding extensors in strength. Very often when the muscles of the calf are affected with cramps, those of the sole of the foot are also; and sometimes the latter are the exclusive seat of violent and intensely painful cramp. Seeing the great relative strength of the flexors of the wrist and hand, and that notwithstanding this fact cramp rarely occurs in those muscles, the explanation I have suggested of the frequency of cramp in the muscles of the calf and of the sole of the foot seems to be invalidated. It must be borne in mind, however, that the lower segments of the spinal cord which govern the lower extremities are more completely automatic than are those which preside over the upper extremities, and that the cramps in question generally come on during sleep. Now, obviously, when the will is quiescent, those parts of the spinal cord which are most capable of acting independently, as the involuntary nervous centres do, will do so on very slight provocation; and this, in my opinion, is the reason why during sleep that part of the cord innervating the lower extremities are most prone to independent action, and why, therefore, cramp, which rarely occurs in the arms, occurs very often in the legs.

The precise mode in which the terrible pains incident to cramp are produced is, in so far as I am aware, unknown, though as it seems to me, it *is easily conceivable.* When dense fibrous textures like to that of the scle-

rotic coat of the eyeball, for instance, are inflamed, they are excruciatingly painful, and the intensity of the pain in these cases is usually explained by saying that as the affected textures are unyielding, the swelling associated with their inflammation causes the nerve filaments distributed to them to be pressed upon from every side, and that this abnormal pressure causes the extreme pain in question. This explanation is probably as true as it is simple; and as the textural conditions out of which the pain arises are somewhat analagous to those of cramp, the explanation of the origin of that pain countenances the idea I expressed concerning the source of the pain incident to cramp, when adverting to the so-called neuralgia of the portio dura. When muscles are intensely contracted, they become, like fibrous textures, dense and hard, and it seems inevitable that they must then exert great and abnormal pressure on the nerves pervading them, and thus originate violent pain exactly as the pressure incident to inflammation of fibrous textures is said to do.—*Medical Mirror, Aug.* 1, 1870, *p.* 152.

20.—TRAUMATIC TETANUS.

By ANDREW BOUTFLOWER, Esq., House-Surgeon to the Manchester Royal Infirmary.

[Elixabeth E. B., 16 years of age, was a patient of Mr. Southam's, at the Manchester Royal Infirmary, admitted on February 3rd, 1870, with symptoms of tetanus, which appeared on the twelfth day after compound fracture of the first finger of the left hand.]

There was considerable rigidity of the limbs, and particularly of the abdominal muscles, there was also some degree of opisthotonos.

About every half hour she was attacked with well-marked spasms, which lasted generally for several minutes.

The injured finger had a very unhealthy and blanched appearance, the bone was united, but the wound, communicating with the bone, was still open; the wound was about a quarter of an inch in diameter, and was situated near the metacarpo-phalangeal joint, the joint itself being considerably thickened.

The wound was quite free from any inflammatory or irritable appearance, yet it was not in a healing condition; the action of the extensor tendon was impaired, and the whole finger seemed shapeless and useless.

As soon as she was admitted (in the evening) she was ordered some brandy and beef tea, half a grain of morphia was injected subcutaneously into her arm, and a linseed poultice applied to the finger. The next morning (Feb. 4th) she expressed herself as feeling much more comfortable, having slept nearly the whole night. At six o'clock p. m. of this day she began to take one grain of the extract of Calabar bean by the mouth every two hours, taking altogether during the night seven grains. This extract was partly dissolved and partly held in suspension, in a little mucilage and water, three grains of the extract being contained in one drachm of the solution, At nine o'clock the next morning (Feb. 5th) half a grain of the extract was injected hypodermically into her thigh; this quantity given by the skin, being considered equal to rather more than one grain by the mouth.

The extract was given every two hours, alternately by the skin and mouth, so that in every four hours one grain and a half were administered, viz., one grain by the mouth and half a grain by the skin. As no immediate effect was produced after this large dose, it was thought safe, and at the same time desirable to increase the quantity given hypodermically; the amount given by the mouth remained stationary, but the alternate doses were each increased by one minim every time they were injected, so that at three o'clock a. m. on Feb. 7th, instead of ten minims (as at first), twenty-three minims, or rather more than a grain, were being injected into the skin. At this hour of the morning she was seized with a severe attack of sickness, profuse sweating, irritation and smarting of the

eyes, unattended, however, by contraction of the pupil; there was still, also, obstinate constipation of the bowels. The twenty-three minims were there ore reduced to twenty minims, and the intervals between each dose increased. As there was no return of the sickness no further reduction was made, but twenty minims were injected hyopdermically, alternately with twenty minims taken by the mouth.

On the 8th of February (the day after the attack of sickness) the spasms had very much diminished in intensity, though still occurring as often as before. On this day, at the request of Mr. Southam, I amputated the finger above the metacarpo-phalangeal joint, as it was perfectly useless, and was possibly keeping up the irritation in the cord. From this day the spasms began to be less frequent; there was still great hardness of the abdominal wall, but there was no return of sickness, nor was there, by any means, complete contraction of the pupil. The spasms ceased on Feb. 11th, and on this day the mouth could be opened to the distance of three-quarters of an inch. The abdominal muscles gradually relaxed; on March 1st all that remained of the disease was a slight rigidity of the jaw, and the sardonic expression in the mouth; both these symptoms had disappeared on March 3rd, when she became an out-patient. The treatment was discontinued on Feb. 13th.

During the attack, the total amount of extract administered was 40½ grains by the skin, and 49½ grains by the mouth, making in all 90 grains given between Feb. 4th and Feb. 13th. It was owing to the satisfactory results obtained by Dr. Fraser and others, from the administration of this drug in tetanus, that the Calabar bean was used on this occasion.

The wonderful effect which it alone possesses of paralysing the spinal cord, without, at the same time, depressing the action of the heart to any great degree, at once marks it out as likely to be efficacious in tetanus, and the happy issue of this, and several other such cases, will justify a farther trial of its remedial powers in this disease.—*Manchester Med. and Surg. Reports, Oct.* 1870, *p.* 52.

21.—SEVERE TETANUS FOLLOWING AN INJURY TO AN ULCER ON THE LEG, TREATED BY CHLORAL HYDRATE; RECOVERY.

Under the care of Mr. BINKETT, at Guy's Hospital.

We lately published notes of two cases of tetanus treated by chloral hydrate, in one of which recovery took place. We have now to add a record of three more, which have been subjected to similar treatment. It is, of course, far too early to draw any definite conclusion as regards the influence of chloral in promoting recovery from this terrible condition, but there would seem to be no doubt of the drug having greatly mitigated the patient's sufferings in the first two of the cases reported. It is only by the comparison of a large number of instances that we can hope to come to a conclusion respecting the merits of the drug, and it is as a contribution towards such a category that the following cases are published.

The first case, which exhibited all the features of severe tetanus, is remarkable, both on account of the exciting cause of the disease, and the relief following the use of the chloral hydrate. It should be observed that when opium was substituted the symptoms became worse, and that the benefit afforded by the chloral, strongly expressed by the sufferer himself, was very striking.

For the report of the case we are indebted to Mr. Branfoot.

R. S., aged 26, a potman, was admitted into Lazarus Ward, on June 28th, 1870. He was well formed and had enjoyed average good health. He had for some years been suffering from an ulcer of the leg, for which he had been under treatment several times, but which had never entirely healed. Ten days before admission he received a kick upon the ulcer. *He took* little account of the accident at the time, but seven days after he

felt slight stiffness of the jaw, with pain and stiffness in the neck. These symptoms increased in severity, and he was admitted into the hospital three days after the first signs of trismus appeared.

On admission he had an anxious expression of countenance; thick speech; the angles of the mouth slightly drawn down; stiffness of the jaw, and difficulty in deglutition; pulse 108, full. Ordered thirty grains of chloral hydrate every four hours.

June 29th. Angles of mouth much more drawn; pain increased in chest, abdomen, and back; tetanic spasms have set in, and continue at slight intervals; sweats violently; tongue red and swollen; pulse 96; respiration 18.

30th. Continues to get worse. Ordered in place of the chloral one grain of opium pill every three hours; wine and fluid nourishment, as much as he can get down. Ulcer very unhealthy-looking; poultices applied.

July 1st. Is very ill; spasms very severe, coming on about every ten minutes, lasting two or three minutes, and causing him to cry out loudly with pain; pulse 88 between the spasms, during which it goes up to 160; respiration 18, abdominal; pupils slightly contracted.

2nd. Spasms more severe, all the muscles of the trunk affected; slight opisthotonos; jaw fixed; gets fluids down pretty well between the teeth; bowels confined.

4th. Has continued to get worse. Has now taken the opium regularly during four days. The chloral resumed, one drachm being given as a first dose, followed by fifteen grains every two hours.

5th. Is a little improved; slept several hours, off and on, during the night; the spasms are still very severe; is unable to pass any urine naturally.

9th. Has much improved; pulse 86; spasms less frequent, but still very severe; took a little solid food; urine passed naturally; bowels not open. Goes on regularly with the chloral, as he feels the want of it when not kept under its influence.

11th. Spasms have increased in severity; pulse 104 between the spasms; during spasms goes up to 180 and becomes very small; respiration 28, abdominal. Chloral increased to twenty-five grains every two hours.

13th. Pains not so great; is very sleepy and seems very low; does not take nourishment so well; pulse 110, small and compressible; sweats and feels cold.

14th. Chloral decreased again to fifteen grains every two hours; pulse 88, very soft; had four spasms during the night, which were less severe. Missed several doses of chloral, as he slept so much better.

16th. Bowels have been opened by turpentine enema for the first time since admission, having previously resisted all attempts.

20th. Took some solid food to-day. Pain and spasms become more severe when any attempt is made to diminish the doses of chloral.

25th. Improving slowly. Spasms appear now to attack the diaphragm, coming on as sudden catches of the breath, with pain in the epigastric region. Takes plenty of nourishment.

28th. Spasms have left him, but he has severe muscular pains occurring in the back and all over the body; spasms are brought on by movements or exposure to slight draught. The chloral is being gradually diminished.

Aug. 6th. Still has slight jerkings of breath at times; takes food well; greatly improved in health.

8th. Chloral entirely left off. Ordered quinine.

11th. Is gaining strength; gets up every day for two or three hours; ulcer looks healthy and is healing up.—*Lancet, Sept.* 24, 1870, *p.* 434.

22.—NOTES OF A CASE OF ACUTE TRAUMATIC TETANUS TREATED BY CHLORAL.

By Dr. ALEX. BALLANTYNE, Dalkeith.

While chloral is upon its trial, the following details of this case may not be altogether uninteresting to the profession :—

On May 12th, I was called to see J. S., a healthy, muscular man of sober habits, aged 34. I found him lying on his back, his head bent backward, and sunk deeply in the pillow. He had a well-marked tetanic expression of face, and could open the mouth to the extent of only half an inch. He was sweating very profusely, and his pulse was 112. On moving the bed-clothes for further examination, he had a severe opisthotonic spasm, during which there was great depression of the ensiform cartilage, accompanied by severe pain in the præcordia, and catching of the breath. These spasms recurred at short intervals. After the spasm the abdominal and thoracic muscles remained persistently hard, the back slightly arched, the legs straight, and their muscles rigid. The breathing was shallow and irregular. There was no difficulty in swallowing fluids, and no evidence of laryngeal spasm.

After a prolonged search a small suppurating wound was found at the base of the nail of the left thumb. He stated that a fortnight ago (April 27th) a thorn had run into his thumb, but that he had altogether disregarded the wound, as it had given him no trouble, though he thought the thorn had not been all removed. Further, that on the 9th of May he began to suffer from pain in the neck and stiffness of the jaw. On the 10th he was worse, and took salts and senna, which acted very severely. On the 11th the medicine still continued to act, spasms affecting the whole body occasionally occurred, and he was entirely confined to bed. He said that since the 9th he had slept but little, on account of the pain in the back. A slight incision through the skin was sufficient to expose the portion of thorn left, which was easily withdrawn, and a poultice applied. As he was some distance from town, I left him two fifteen-grain doses of Dover's powder, to be given with an interval of three hours between them.

On the following day (13th) it was found he had passed a sleepless night, and had suffered severely from spasms, recurring at short intervals. Condition generally much the same as yesterday. Pulse 112; temperature 103°; profuse sweating. Determined to give chloral alone in subsequent medicinal treatment. At 2.30 p. m., one drachm of chloral was given, and in five minutes he was asleep, rigidity of the muscles of the abdomen, thorax, and legs still remaining. Slept without stertor till 7 p. m., when he awoke, took beef-tea with relish, and slept till 9.30 p. m. At 10 p. m., pulse 100; temperature 99·5° (note the fall). He has no perspiration, and does not complain of pain; muscles still very tense. Gave half a drachm of chloral, which was repeated at 1 a. m. on the 14th, and also at 6 a. m., 10 a. m., and at 12 a. m., making in all three drachms and a half in the twenty-four hours, fluid food being taken freely, sometimes before and sometimes after the medicine.

(To prevent repetition, I may say here that fluid food and stimulants were well taken throughout the illness, and had undoubtedly much to do with the favourable issue of the case.)

14th. Noon: Pulse 100; temperature 99°; no sweating; muscles very rigid; diaphragmatic spasms recur at longer intervals. Since 12 o'clock yesterday has had three drachms of chloral, given in half-drachm doses. At the evening visit the patient lay for the first time on his side, the abdominal and thoracic muscles much less tense, and the legs flexed. Breath exhales chloral; no stertorous breathing; pulse and temperature the same as last visit.

15th. Noon: Pulse 94; temperature 99°. Chloral given as on the 14th. *Patient* is easily roused. Complains of pain in the muscles of the back

and legs. He can open his mouth widely; tongue dry and brown; conjunctiva very red; speaks thickly. Ordered chloral to be given every five hours in half-drachm doses.

16th. Noon: Pulse 90 in sleep; temperature 99°; general condition of patient the same as yesterday. Aperient medicine given.

17th. Noon: Pulse 90; temperature 98°. Fifteen grains and half a drachm of chloral to be given alternately every four hours, as the muscles are less rigid and the spasms almost gone.

18th. After a second dose of aperient medicine, the bowels were moved freely, without any severe spasms occurring. Pulse in sleep 86; temperature 98·2°. Chloral as before.

On the morning of the 20th, patient progressing favourably. Fifteen-grain and half-drachm doses of chloral continued. In the evening, found patient much worse; pulse intermitting, 130; temperature 98°; breathing in long deep sighs; surface moist; extremities cold; no spasms. Upon inquiry, found he had been most injudiciously lifted out of bed while the soiled linen was removed. Ordered hot bottles to the feet and sides, stimulants to be freely given (two ounces of brandy every hour), and chloral to be intermitted for a few hours.

21st. Patient much better; pulse 100, regular; temperature 98·5°. Complains much of pain in the back and legs, and suffers from spasm. Chloral as before.

After this date, the patient steadily improved. The chloral was given in varying and gradually decreasing quantities till the 3d of June, when it was discontinued.

June 6th. Patient quite convalescent; entirely free from hardness of the muscles; takes solid food with ease, and has no discomfort whatever.

Remarks.—This (though the ninth) is the only case of traumatic tetanus I have seen recover. To what extent the chloral had to do with the recovery it is not easy to determine exactly. That it played a most important part as a palliative in the treatment no one will deny. I have chosen to call the case one of *acute* tetanus, because, although nearly a fortnight had elapsed between the reception of the wound and the occurrence of trismus, although the temperature on the fourth day was only 103, and although the muscles of the larynx and of deglutition were unaffected before the first dose of chloral was given, the extent, frequency, and severity of the spasms, the intensity and length of the diaphragmatic spasm, and the persistent rigidity of the thoracic and abdominal muscles, were as great as in the fatal cases I had seen. The high temperature noted in tetanus—110° Fahr., and over 44° C. (Wunderlich)—is generally observed towards the end of the disease when fatal; and this remark applies frequently also to the spasm of the muscles of the pharynx and larynx, which sometimes remain unaffected for days even in fatal cases, and only subsequently become the seat of spasm. Whether in this instance the use of chloral prevented the spasm spreading to these muscles of course we cannot say, but it is not improbable. In giving the chloral, it was observed that the patient was less rapidly affected by it as the doses were repeated, and that the first dose of one drachm had the most marked effect, reminding one very much of the rapid effect of chloroform in cases of severe and protracted labour, where the patient is much exhausted. The congestion of the conjunctiva was very great during the exhibition of the remedy, and continued for some days after the doses were much lessened.

In all, the patient had six ounces and a quarter of chloral during the three weeks, on an average of two to two and a half drachms per diem. After the 20th the chloral was sometimes intermitted for several hours; but when more than six hours elapsed, the symptoms invariably became more intense, and the patient required a larger dose more frequently repeated during the next eight or twelve hours. Not unfrequently an extra half-drachm of chloral was given in addition to those noted in the report for some specially severe time of suffering.

I have given chloral *very frequently*, and have found it most useful in

hooping-cough, in all varieties of neuralgic pain, in the insomnia of drunkards, in aggravated hysteria, and in one case of acute mania. In hooping-cough very small doses were enough, from two to five grains. In the insomnia of drunkards, sometimes doses of one drachm required to be repeated.—*Lancet, June* 25, 1870, *p.* 898.

23.—A CASE OF IDIOPATHIC TETANUS.

For the particulars of this case we are indebted to Mr. Harry Leach, of the Dreadnought Hospital.

Owen T., aged 37, was admitted into the Seamen's Hospital, on the 25th of August, with symptoms of tetanus in a marked form. There was excessive rigidity, the jaws were tightly closed, speech and respiration were difficult, the face suffused, consciousness complete; pulse 102.

The history of the case indicated little. The attack appeared to have commenced, about five days before admission, with general stiffness of the neck, from no apparent cause. This stiffness gradually extended to the jaws, without any other symptoms. There was no trace of a wound or injury of any kind.

A drachm of the chloral hydrate was given every three hours, from 5 p. m. on the 25th to 3 a. m. on the following day, so that half an ounce was taken. This, with small and oft-repeated quantities of milk and beef tea, was swallowed with difficulty, though no relaxation of the jaws took place. About 7 a. m. on the day last quoted, very decided and severe spasms, affecting the hands and feet, came on, and elicited loud cries. They recurred at frequent intervals; and, as the pupils were now contracted, the chloral was discontinued for a time, and the patient was brought partially under the influence of chloroform whenever there were indications of a return of the spasms. This resulted in a considerable relaxation of the muscles of the jaws, and a good quantity of fluid food was taken. During the afternoon of the same day the chloral was repeated, and chloroform was frequently given. The patient passed very little urine, had no stool, but took fluid food at intervals of about fifteen minutes, and had a very fair amount of quiet and genuine sleep. At 6.30 chloroform was again administered on account of an unusually severe spasm with screams. He took food well a few minutes subsequently, but died very suddenly twenty minutes after in a severe convulsive fit. No post-mortem examination was made.

The progress of this case was more hopeful than usual; and though, as is commonly the case, the result was unsatisfactory, experiences gleaned in this instance tend to indicate that the chloral hydrate is worthy of an extended trial, with inhalation of chloroform, whenever the tetanic spasms threaten. No stimulants were given.—*Lancet, Sept.* 24, 1870, *p.* 435.

24.—CASES OF DELIRIUM TREMENS RAPIDLY CURED BY HYDRATE OF CHLORAL.

By Dr. J. Corbet Fletcher, C. M., Tottenham.

Miss E. B., aged 33, showed symptoms of a second attack of delirium tremens on June 12th, the first having occurred last summer. Her rest at night, prior to this date, had been often disturbed by frightful dreams; but on the night of the 12th, she frequently came to her father's bed-room, declaring that the house was on fire, &c. This state continuing on the 13th, I was called to see her on the evening of the 15th. She was not in *bed on my* arrival, but was running about in her room with her eyes

directed to the ceiling, where she declared she saw a variety of visions. The wonderful rapidity with which her hallucinations, and also her attitudes, changed at once, suggested Watson's busy delirium. Pulse 90, weak. Though her face was suffused with perspiration, her skin felt cold and clammy. The tongue was furred; the breath was mawkish, with a vinous odour; her hands trembled, the tongue only slightly. A purgative was given, and a warm bath. Beef tea was ordered to be given regularly; the nursing to be kind, but firm.

Early on the 13th I was called, as her condition was much worse. She had not slept during the night; the visions were wilder than ever; pulse 120. She seemed exhausted and anxious; the lucid intervals were few. She saw ugly animals on my coat and on her bed, and tried to catch them. The bowels had not been opened. Another purgative was given. To secure sleep, she got half-drachm doses of bromide of potassium every hour. At 9 p. m., the excitement and hallucinations had increased: the bromide had no effect. Remembering Dr. Gairdner's suggestion to try hydrate of chloral as a tentative remedy in delirium tremens, and being unwilling to give opium except as a *dernier ressort*, I gave half-drachm doses of hydrate of chloral every two hours until sleep was secured. The first dose was given at 10 p. m. The patient became slightly drowsy soon after its administration, but it did not produce sleep. The second dose was given at 12. In ten minutes she fell into a sleep—light and often disturbed at first, but gradually deeper. At last she slept soundly until 8 a. m.

June 16th. 11 a. m., pulse 76. She felt muscularly tired. The excitement and hallucinations were all gone. She talked quite sensibly. There was nothing to indicate her former condition except an unsettled stare in her eyes, and slight fidgetiness of manner.

June 17th. To-day she was in her right mind, and enjoyed a walk with her sister. Truly, the effects of chloral in this case were almost miraculous.

Case 2. Mr. N., aged 54, who had frequent attacks of delirium tremens, sent for me June 18th, at 3 a. m. His present attack began thirty-six hours before my arrival. He was in great pain, with cramps in his legs and painful spasms in his abdominal muscles, which caused him frequently to double up as if suffering from slight tetanic emprosthotonos. The hands twitched; the tongue was very shaky; the breath was very disagreeable, with a strong alcoholic odour. He had very marked hiccough. There was no mental alienation. A purgative was given, and half-drachm doses of hydrate of chloral. The first dose was given at 4 a. m. In a short time he fell into a sleep which was not very sound. After the second dose, at 5.30 a. m., he slept soundly until awakened at 11.30 a. m., when he said he felt ready for beef tea. The muscular twitching was not wholly gone; but the painful spasms and all the worst symptoms of his case had disappeared. After getting some food, he fell soundly asleep again.

On June 19th pulse was 84; he was much better. To secure rest, he had half a drachm of hydrate of chloral the previous night, after which his sleep was unbroken. He had no headache nor other bad symptoms attributable to chloral. He took his food well.

On June 20th he was so well that further attendance on him was almost unnecessary.—*British Medical Journal, July* 16, 1870, *p.* 62.

25.—CHLORAL IN DELIRIUM TREMENS.

Cases under the care of Dr. J. Russell Reynolds

Mr. W. Rigden, Physician's Assistant at University College Hospital, sends the following notes of cases under Dr. Reynolds:—

Case 1.—A clergyman, aged 40, has been a drunkard for years, but worse since his marriage three and a half years ago to a woman beneath him in station and with whom he does not seem to have got on well. He has been in

the habit of taking all kinds of drinks. Has had delirium tremens several time, the last bad attack being a little more than a year ago. Sometimes he has gone for six months without taking any drink.

His father died of paralysis from disease of the brain. The history of insanity is very uncertain.

On May 3rd, 1870, having been pretty steady for six months, he began to drink, brandy especially, and on May 8th he had become so violent that the doctor in attendance placed a keeper over him; he still, however, continued to take some beer and brandy.

May 11th. When he was admitted, the keeper said he had not slept for a week till the night before, when the doctor gave him a dose of a new medicine (probably chloral), and he had seven hours' sleep. He had been very tremulous; taken very little food; very violent at times, especially on seeing his wife.

On admission his tongue was a little coated, slightly tremulous; there was slight tremor of arms; pulse was a liltle over 100, moderately full. He complained a great deal of his wife, whom he threatened to kill, and to his being detained at the hospital.

He was ordered good diet; 30 grains of chloral at bed-time, and ℥ iss of haust. domest. the first thing in the morning. No stimulants.

May 12th. He went to sleep immediately after the chloral, and slept for three hours, when he was awoke by a noise in the ward, and after being awake for an hour the dose was repeated, with the result of sending him to sleep immediately. The house medicine has acted freely. Patient is this morning pure and rational; complains of no headache, only a sense of faintness and weariness; pulse 88, moderately full; appetite very defective.

May 14th. Is quite well; takes his food well; being inclined to be restless at night, he has had the chloral repeated every night. Discharged.

Case 2.—An engine-driver, aged 22, has been given to drink for ten years. Had delirium tremens five months ago, since which he has been drinking as bad as ever. Father says he has not been sober for three weeks. He drinks beer especially. No family proclivity to drink.

Present attack began on May 8th, 1870, with trembling loss of appetite, great restlessness, delusions of all sorts, occasionally with violence.

Was admitted on May 11th, not having slept since the commencement of the attack; he was very quiet and tractable, easily put to bed. Tongue thinly coated, slightly tremulous, little tremor of his body. Pulse rather weak; ordered good diet. No stimulants.

10 p. m. Has been very quiet, but has not slept. Temp. 99·8° F.; pulse 100.

Ordered chloral hydrate gr. xxx every hour until sleep comes on, and ℥ iss of house medicine early in the morning.

May 12th. Chloral was continued every hour till 3 a. m. this morning without producing any sleep. He got more excited, wanting to get out of bed, and slightly delirious.

Chloral was omitted, and bromide of potassium gr. xx every hour ordered. At 6 a. m., not being asleep, gr. ¼ of acetate of morphia was given hypodermically, and the bromide of potassium ordered every three hours. He went to sleep at a quarter to nine this morning, and has been sleeping off and on all the morning. His bowels have not acted. Not having passed water since admission, a catheter was passed, and 22 oz. of dark coloured urine drawn off. Ordered gr. v of calomel.

May 13th. Bowels opened moderately after the calomel; slept well last night, without medicine. Temperature 98·4; pulse 76, rather small and thready. Appetite bad. Ordered—

℞. Mag. sulph. ℥ j.; tinct. zingiber, ♏ xxx.; dec. aloes co. ℥ j. Fiat haust. st. sumenda.

May 14th. Pulse improved, appetite better; patient still in a very sullen humour. Bromide of potassium omitted, and some ammonia and bark ordered.

May 20th. Discharged.

Case 3.—A gentleman, aged 32, engaged in literary pursuits, having been very much worried, took to drink six months ago, and, according to all accounts, has not been sober nor absolutely drunk for six months. His principal drink has been brandy and wine. His grandfather, on the mother's side, was a very great drinker, and his mother's brother is in a lunatic asylum through drink.

On May 13th, when admitted into the hospital, he was perfectly rational; said he thought it the best thing for him to come into a hospital; he was very unsteady in his walk, very flushed about the face. There was a good deal of tremor; tongue coated, tremulous; pulse full and strong. To have white of egg and just enough sherry to make it taste, every two hours. Pulv. opii gr. iss at bed-time, and pulv. seidlitz in the morning.

May 15th. Not having gone asleep, and getting more excited, he was given at 1 a. m. gr. ⅛ of acetate of morphia hypodermically, and at 6 o'clock, gr. ¼.

5 p. m. Has not slept; is very excited. Bowels have not acted; has been sick after everything he has taken all day. Ordered—

℞. Ol. terebinth. ʒss.; mist. acaciæ ʒj.; dec. hordei diss. Fiat enema statim ad min.

Et ℞. Pot. bromidi ℈j.; sp. æth. nitrici ʒss.; mist. camph. ʒij. Fiat haust. 6tâ quaque horâ sumend.

10 p. m. Morph. acetes gr. ¼ hypodermically.

May 15th, 1 a. m. Rep. morph. gr. ¼.

Bowels freely opened after enema; vomiting not so severe. All last night was very delirious, fancying all sorts of horrible things were going to happen to him. To have beef tea alternating with the egg; to have a little brandy instead of the sherry, but not more than ʒvj. in the twenty-four hours—only for a taste.

9 p. m. Rep. hypoderm. gr. ⅜.

May 16th. 4 a. m. Rep. hypoderm. gr. ½.

9 p. m. Has not slept at all; was more excited than ever last night. Pupils just a little smaller than natural. Sweats profusely; takes his food well. Pulse not so strong as formerly, but still very good.

5 p. m. ℞. Chloral hydrat. gr. lx.; tinct. aurantii ʒj.; aq. puræ ʒj. St.

17th. Patient went into a light sleep ten minutes after taking the chloral, and continued sleeping, waking up at intervals of a few minutes for nourishment, till midday to-day, when he was very much better; not quite rational. He was then ordered—

℞. Mag. sulph. ʒij.; tinct. zingiberis ♏xxx.; tinct. card. co. ♏xx.; dec. aloes co. ʒj, Statim.

18th. Perfectly rational; slept well last night. Bowels open freely. Feels very hungry; brandy stopped; meat ordered. Has only a little pain over brow.

21st. Has slept and taken his food well; pain quite gone; has been taking the bromide of potassium, but no more chloral or morphia. Discharged. —*Practitioner*, *Aug.* 1870, *p.* 124.

26.—DIGITALIS IN DELIRIUM TREMENS.

FIVE CASES SUCCESSFULLY TREATED BY HALF-OUNCE DOSES OF THE TINCTURE; WITH REMARKS.

By Dr. ALFRED WILTSHIRE, Junior Physician to the West London Hospital; Physician to the Samaritan and the British Lying-in Hospitals.

The Lancet of June 4th contains an account of a case of delirium tremens successfully treated by large doses of digitalis. The publication of that case, together with those recently published by my friend Mr. Nankivell, has induced me to recount my experience of the drug in similar instances. I may premise that four of *my patients* had one dose only; but that, it is

right to add, consisted of half an ounce of the tincture of the London Pharmacopœia. The other patient had, first half an ounce, and then, after the lapse of some hours, two drachms.

Case 1.—The first case treated with what may be regarded as an heroic dose was that of a woman, aged about 40, who was engaged in the kitchen of a large institution where she had ample opportunity of obtaining stimulants. When she first became delirious, a full dose of opium was given by the surgeon in attendance, and was repeated some three or four times. In spite of this, however, she became so excited that it was thought desirable to send her to the insane ward, where, shortly after her admission, two drachms of tincture of opium were administered. No improvement followed the exhibition of this large dose, and the gentleman in attendance gave up all hope of saving his patient. At my suggestion, half an ounce of tincture of digitalis was administered. I watched the effect of this, and observed that twenty minutes after its exhibition the patient fell asleep. She slept for several hours consecutively. On awaking, as she was still somewhat delirious, though much less excited, I thought it desirable to give her two drachms more of the tincture. After this no further treatment was required, and the woman quickly resumed her duties.

Case 2.—The next case that came under my notice was that of a potman, aged 35, whose symptoms for the two first days of the attack were so like those of enteric fever that it was not without some difficulty that I made a correct diagnosis. Parenthetically I may observe that, probably, had the clinical thermometer then been in use, the difficulty I experienced would not have arisen. Moderate doses of opium did no good, nor did like doses of tincture of digitalis. The patient became so much worse that I determined upon giving him half an ounce of tincture of digitalis. My notes state that "he was asleep within ten minutes of taking the dose; slept for four hours; then was awake for half an hour; and then slept again for two hours, making six in all." This was the first sleep he had had for nearly a week. He was well in a day or two.

Case 3.—The subject of this case was a grocer aged about 26, who, having inherited a considerable sum of money, was unwise enough to indulge in repeated debauches of a serious character. I learned from his wife that he had previously had at least one severe attack of delirium tremens. When I saw this patient he was in a state of high delirium and very troublesome. I need not detail the treatment adopted; suffice it to say that, in spite of opium, antimony, henbane, oxide of zinc, cannabis indica, &c., he did not improve; indeed his condition became really alarming. Half an ounce of tincture of digitalis now appeared to me to be the only remedy likely to benefit the patient, and accordingly I gave him that dose. I should here state that up to the moment of giving the tincture the pulse was rapid and of an irritable character. The heart seemed to me to beat much too often and to do but little real work; and this I believe was actually the case, for in a very few minutes after administering the drug I noticed that, whilst the pulse, which I closely watched, had fallen in frequency, it had increased considerably in volume, and this at the time to me somewhat alarming change was exactly coincident with the supervention of sleep, which occurred in less than twenty minutes after the exhibition of the remedy. This one dose cured the patient of that attack, and for some time he remained well and temperate. At last, however, he again broke out, and I attended him once more in a similar attack, which will be detailed under the heading of Case 5, as I prefer to relate the cases in the order in which they occurred.

Case 4.—In this instance, the patient, a young gentleman aged 21, who had forfeited an excellent Government appointment through drunkenness, was furiously delirious. Neither opium nor morphia had any good effect upon him, and it was only after their failure that I ventured upon giving a large dose of digitalis. In this case, as in the last, I closely watched the effect of the drug upon the pulse, and with precisely similar results: it *fell in frequency*, while it gained in force and volume. The patient was

asleep within a quarter of an hour of taking the medicine, slept for ten hours consecutively, and on awaking felt and remained perfectly well. This patient died a year afterwards of phthisis, induced undoubtedly by drink and debauchery.

Case 5.—This occurred in the person of Case 3, and is peculiarly interesting on the following account:—

Dr. Russell Reynolds, whom I had acquainted with the success I had met with in the foregoing cases, suggested that possibly the good effect of the half-ounce of tincture of digitalis might be owing to the alcohol it contained, and not to the digitalis; and he recommended that, if I had an opportunity of doing so, it would be well to try the effect of half an ounce of proof spirits. Dr. Reynolds, also, suggested that, if I found it necessary to resort to digitalis, it would be desirable to give a watery infusion of the drug, using a dose of it equal in strength to half an ounce of the tincture. It so happened that, shortly after this conversation, Case 3 again came under my care, with another severe attack of delirium tremens. I felt it to be my duty to give him the benefit of ordinary treatment at the outset, as I had done in the first attack for which I attended him; but the result was equally unsatisfactory, and, ultimately, I judged it to be necessary to give him digitalis again. But before doing so I determined to put into practice Dr. Reynold's suggestion. I accordingly gave half an ounce of proof spirits; and although for a considerable time I carefully watched the patient after its administration, I could detect no change whatever either in the pulse, respiration, or mental condition. Finding the result of this experiment to be purely negative, I resorted to the half-ounce dose of tincture of digitalis, as I found a difficulty in procuring good digitalis leaves wherewith to make a watery infusion. This, happily, acted as efficiently as a like dose had done on the first occasion; and the phenomena observed after its administration were of precisely the same character—that is to say, the pulse fell in frequency while it gained in volume and strength, the breathing became more tranquil, and the patient fell asleep within twenty minutes of taking the drug. After some hours' sleep he awoke cured.

Remarks.—No bad or dangerous effects were observed in either of the cases narrated, although, I confess, that the marked decrease in the frequency of the pulse at first made me uneasy; and, had I not recognised that, while it fell in frequency, it gained remarkably both in force and in volume, I should have been alarmed.

It will be observed that my patients were young, or compartively young, persons; for I am averse to treating the aged by means of large doses of digitalis, being, in truth, as it were instinctively, afraid to do so. And, even in the young, I was and still am loth to resort to so powerful, not to say dangerous, a remedy without, in the first instance, having given the patient the benefit of what is regarded as more orthodox treatment, which, undoubtedly, succeeds in the majority of cases. In endeavouring to analyse the reasons which influenced me in giving these large doses to young, or comparatively young, patients (for age should not be measured by years alone), and withholding them from others, I made out the process of reasoning to be somewhat as follows; and I venture, although with some diffidence, to mention it, because I believe it to have served me in good stead.

There is unquestionably a great disturbance of the vascular system in delirium tremens. Whether arterial tension be lessened or increased need not now be disscussed: this much we may safely assume, that there is a considerable departure from the normal standard, and as long as that departure is maintained there is delirium. It is well known that digitalis exerts a very powerful influence over the heart and the whole vascular system. Its precise *modus operandi* is perhaps beside the object of this paper, but I cannot forbear remarking that probably the following explanation is very near the truth. It is admitted on all hands that digitalis retards the action of the heart, and by most observers that it materially increases the tone of

that organ. Now, retardation of the heart's contractions gives more time for the auricles to unload themselves into the ventricles, and in this way venous stasis may be lessened; while, from the increased force with which the ventricles, especially the left, contract, the arterial and capillary circulation may be improved. But, whatever may be the condition of the vascular system in a given case of delirium tremens at the moment of exhibiting a large dose of digitalis, it is thereby altered. It is this sudden alteration which I think unquestionably takes place that, in my judgment, makes large doses of digitalis dangerous; for whether arterial tension be increased or diminished, the alteration is so sudden that unless the vessels be sound and elastic they cannot quickly enough accommodate themselves to the change, and hence, I believe, the danger. It is clear that those persons whose arteries have become inelastic from degeneration cannot safely bear sudden changes in the tension of their vascular system; and *â fortiori*, those in whom this degeneration (or "rottenness," as Sir Wm. Jenner aptly expresses it) has gone on to any great extent are in the greater danger, and that for two reasons—first, because the rotten spots may give way if the tension be suddenly increased; and secondly, because the rigid arterial tubes cannot contract upon, and accommodate themselves to, the lessened volume of blood if it be suddenly diminished. This, I believe, will explain why *large* doses of digitalis are so dangerous to the aged. *Small* doses, I need hardly say, are invaluable in the treatment of the cardiac affections of old people; and it may be that their cautious use may prove beneficial in the treatment of delirium tremens occurring in persons of advanced years.—*Lancet, Aug.* 27, 1870, *p.* 286.

27.—ON THE NATURE OF THE CONDITION CALLED EPILEPSY.

By Dr. J. Thompson Dickson, M. A., Medical Superintendent of St. Luke's Hospital.

[A great deal has been written upon this interesting subject, and much has been firmly established. The first real step in advancing our knowledge of the subject was made by Schroeder van der Kolk, whose researches were followed by those of Brown-Séquard.]

The following are the ideas which it is my intention to attempt to establish:—

1. Epilepsy is a contraction of the cerebral capillaries and small arterial vessels; the order of its stages in an epileptic attack being, irritation of brain, either direct or secondary to exhaustion; contraction of cerebral capillaries and small arterial vessels; cerebral anæmia, and consequent loss of consciousness.

2. The muscular contraction and spasm, together with all the varying phenomena associated with epilepsy, are altogether secondary, and not at all essential or constant, but they are all manifestations of imperfect nervous (cerebral) control, or a loss of balance between the nervous and other systems.

It is perhaps unnecessary to prove loss of consciousness as the first subjective phenomenon of epilepsy, since it is on all hands admitted; or, as stated by Trousseau, it may be considered the pathognomonic sign of epilepsy. To whichever variety of the two great specific forms—*le petit mal* and *le haut mal*—any individual seizure may belong, we can always, by strict inquiry, find some amount of unconsciousness in the first stage. The absolute fixedness of this rule—which may almost be called a law of epilepsy—has been doubted, I know, by few. I shall endeavor to meet their objections further on in this paper.

The condition of anæmia is, strange to say, the one which was long unobserved; and, in fact, only within the last few years has it been noticed at all. The congested state of the vessels of the face and neck attendant upon epilepsy is secondary; but so much more striking is it, that for long it was the only condition of vascularity observed. The pallor of epilepsy

is sometimes of considerable duration; but this is more particularly the case in *le petit mal*, the almost endless varieties of which were not until lately recognized as epileptic, and, consequently, as they were considered as fainting attacks, the attendant pallor made no impression on observers; usually, however, especially in *le grand mal*—it is fleeting. The fact of pallor, however, is an indication, though not a certain evidence, of cerebral anæmia. It would appear highly probable that the face and neck sympathise with the internal condition of the skull as regards sanguiniference; but further evidence is necessary, since, on simple principles of animal mechanics, if one set of vessels be empty, another set must be more or less full; and the question might reasonably be asked, why the surface-vessels of the head should not be the ones to take up the opposite condition to that of the cerebral. The question would, however, be specious, since it is the venous rather than the arterial vessels that receive the blood; but this is not altogether absolute. The best evidence that the surface vessels correspond with those of the cerebral is, that consciousness is lost during the anæmic state, while, in conditions presumably congestive, *e. g.*, the paroxysm of whooping-cough, consciousness never, in the true sense of the expression, disappears.

Animals that have died or being killed during a fit have always exhibited brains perfectly anæmic, blanched, and bloodless. This is borne witness to by Schroeder van der Kolk, Trousseau, and Brown-Séquard, and has obtained in all my own experiments and observations.

3. Whenever cerebral anæmia is by any means brought about, loss of consciousness, is the result; *e.g.*, if pressure be made upon the brain or cerebral membranes of an animal, or if the brain be wounded, anæmia and loss of consciousness instantly result. In the case of an infant among the outpatients of Guy's Hospital, said to be epileptic, I made simple pressure with my finger upon an open fontanel, and produced the whole of the epileptic phenomena perfectly. An animal bled to death passes through all the stages of epilepsy before the final struggle. It is hardly necessary to multiply the evidence on this point. It is essential, however, to demonstrate the fact of the contraction of the capillaries and small arterial vessels as a result of irritation or exhaustion, as it is to this contraction that the anæmia and loss of consciousness are due.

Direct irritation, such as that already mentioned, viz: pressure on the membranes or a wound of the brain, are always followed by instantaneous contraction of the smaller cerebral vessels, but, at the same time, the capillaries of the medulla oblongata become distended. This point is one particularly worthy of notice, and was first observed by Schroeder van der Kolk. If an animal be trephined, and a knife plunged into his cerebrum, the whole of that organ will become instantly anæmic, and its small vessels will be found contracted, while those of the medulla—particularly the capillaries—will be found full and distended. It is well to try this experiment on an animal, the subject of epilepsy, as the constant recurrence of the seizures permanently dilates the capillaries of the medulla. It must not be assumed from this that the blood from the cerebral vessels passes to the medulla. It is more likely that, on account of the sudden check to the circulation of blood in the cerebrum, the cumulative force of the arterial current endeavors to expend itself in the nearest channels, of which the medulla forms one; and the absence of resistance, owing to the yielding nature of its material, readily allows the dilation, which continuously increases the longer the epilepsy is continued.

It thus is clear that, in the relations of cause and effect, the dilation of the capillaries must be included under the latter head, and must be considered as altogether secondary to the epilepsy.

As the actual pathological lesions associated with epilepsy, I may enumerate tumours involving surface, surface-abscess, tuberculous membranes, thickened membranes, adherent membranes, and atrophy, to which I may add, as a rare though occasional condition, surface-softening, and perhaps softening of the cord. This synopsis is from an examination of the daily

records of *post mortem* examinations at Guy's Hospital, extending over ten years; and to it I will add bony tumours projecting from the inner table of the skull and encroaching upon the surface of the brain; also ossific membranes.

Extensive disease may occur in the centre of the brain; but unless the surface be involved, the central pathology will not be associated with epilepsy as a concomitant.

The histories of clinical cases give unequivocal evidences of tumour and syphiloma, thickening of the cerebral membranes from alchoholism and blows, and hereditary transmission of both syphilis and nervous imperfection; while fright has sometimes been set down as a cause. It occasionally happens, however, that the physician will be baffled in every attempt to find out the particular predisposing cause in an individual.

I have already observed that any cause which tends to produce an anæmic condition of the brain is sufficient to induce convulsion, exampled in the sudden and direct depletion, as when an animal is bled to death; a more gradual drain, however, will produce the same result. For instance, menorrhagia may stand in the relation of cause to effect; also watery conditions of the blood, as in albuminuria, whether of morbus Brightii or of parturient women. Again, excess of urea, as well as poisons directly introduced into the blood, as atropine, narcotine, nicotine, will also stand in the same relation. Another and not uncommon cause is distant local hyperæmia, exampled especially in children who suffer from convulsive disease, as an affection secondary to disturbance of the digestive organs and the irritation of worms; exemplified also in the dentition of infancy, but in this latter case, as perhaps also in a minor degree in the former, the element of peripheral irritation must be somewhat taken into account. Irritation of the peripheral extremity of a nerve will produce epilepsy. A remarkable case was quoted by Dr. Brown-Séquard (reported by the late Mr. Standist, of Taunton); and I have seen more than one case of epilepsy traceable to carious teeth. The constant irritation of the extremity of a nerve exhausts the potential energy of the cells from which the nerve takes its rise, and produces a condition very similar to shock, whether physical or psychical. All forms of shock appear undoubtedly to determine the occurrence of epilepsy in some individuals; yet, with regard to the psychical variety, I would speak very guardedly. One case under my observation for some time was attributed to fright! A *post mortem* examination exhibited a surface-tumour. Another patient, the widow of an officer who was murdered before her eyes in the Indian mutiny, stated that she had been epileptic ever since the fright she received on that heart-rending occasion. She had, however, suffered from that time up to the time I saw her more or less from menorrhagia. The epilepsy was always increased when the flux was augmented, and lessened when it abated. After a short treatment directed towards the control of the menstrual discharge, the epilepsy ceased to recur, and she has remained free from the attack ever since.

Dr. Brown-Séquard, in the commencement of 1869, stated to the French Academy that, in continuation of his experiments in inducing epilepsy by section of the spinal cord, he had concluded that the greater part of the cord takes an active part in the production of convulsion, because he had seen attacks occur in the muscles innervated by a segment of the cord comprised between two sections. The fact, as stated by Dr. Brown-Séquard, has, however, very little real bearing on the subject of epilepsy, except to confirm the truth of the hypothesis that the convulsive movements of epilepsy are the result of loss of control.

Dr. Brown-Séquard further stated that the brain seemed to take no part in the convulsion, because convulsive seizures continued to be produced in epileptic guinea-pigs, in which life was maintained by artificial respiration after the brain had been removed. This fact at least tends to confirm the idea I proposed at the commencement of this paper, viz: that convulsive movement in epilepsy is the result of a loss of cerebral control, *or loss of* balance of control between the cerebral and other systems.

An animal with a bloodless brain—the effect either of direct depletion or of irritation from any cause—is in very much the same condition as an animal without a brain at all; and, therefore, there is not that discordance between clinical observation and the results of the experiments of Dr. Brown-Séquard which MM. Colin, Ricord, and Hardy, attempted to show, when Dr. Brown-Séquard's paper was discussed. Dr. Brown-Séquard stated that he had never been able to produce epilepsy by unilateral division of the cord in any animal other than the guinea-pig, except the cat. It is a fact worthy of record that I have induced epilepsy in the rabbit by unilateral section; I have also seen one case of epilepsy in a wild rabbit.—*British Medical Journal*, *June* 4, 1870, *p.* 568.

28.—A CASE OF HYSTERIA; "TEMPER-DISEASE," HYSTERICAL (?) CONGESTION OF THE LUNGS, AND PERSISTENT VOMITING.

By Dr. JOHN W. OGLE, Physician to St. George's Hospital.

Amongst the various puzzling and anomalous symptoms presented by those who are the unhappy subjects of that condition which we term the hysterical one—"the most profitable and safe of diseases in the catalogue of the ills that flesh is heir to"—none are more difficult to contend with, none more apt to give trouble in diagnosis, than those which the insight of Dr. Marshall Hall included under the designation of "temper disease." In this form of ailment, the mental disposition or temper becomes perverted; there is disturbed equilibrium of the naturally well balanced moral faculties. As that writer observes, "its object is frequently to excite and to maintain a state of active sympathy and attention, for which there is, as it were a perpetual morbid and jealous thirst. It was," he observes, "rather aptly designated by the clever relative of one patient an egomania. One patient cannot articulate; another cannot walk; a third cannot eat, cannot swallow, or if deglutition have been performed, does not retain the food on the stomach, but, without nausea, and apparently without effort, returns it, as it were, by an act of easy rumination." He relates instances in which spasmodic action of the muscles of different parts persisted for several hours, keeping attendants on the watch all night; instances of ptosis and various forms of paralysis of limbs, of dysphagia, of inability to write properly, inability to retain or pass the fæces or urine; examples of abdominal tumour, &c—all occurring in connexion with the "temper disease;" and observes that, though these cases occur chiefly in young females, yet males, and in some instances children, may be the subjects. I propose, in the present lecture, to bring before your notice a case which lately occurred in the hospital, and which some of you may have watched, in which from sheer obstinacy, the patient refused food to a considerable extent, in illustration of this temper-disease. But please to bear in mind that this affection obviously is not (again to quote Dr. M. Hall) altogether a feigned disease, but a perversity, an insaniola, originating in bodily disorder or mental affection, and perpetuated by a morbid indulgence of temper and desire for sympathy and attention.

Sarah G., aged 20, rather delicate and interesting looking, was admitted into Crayle Ward, St. George's Hospital, October 6th, 1869. According to her statement, she had been ill for twelve months with "cold and cough," attended during almost the whole of that period by vomiting, which had been pretty constant. Until four months before admission, it was affirmed that *the catamenia had never appeared*. It was also stated by herself that she had been an in-patient at Christmas, 1868, at St. Mary's Hospital, and also in University College Hospital in June, 1869, where she had been treated for pain at the lower part of the left side of the abdomen, and for vomiting, which came on directly after eating food. At that time

she was blistered. The above information was elicited from herself. Upon inquiry, I could not find out anything about her having been at University College Hospital; but Dr. Cheadle told me that she had been under Dr. Handfield Jones's care at St. Mary's; and that, according to the Registrar's account, the case was entered as "bronchial catarrh and deficient menstruation." It is stated that she had been ill three months with cough and vomiting, having previously been in good health; and that, whilst in the Hospital, she complained of pain in the left side, worse after eating and at night. Dry wheezing inspiration was heard to the right of the left nipple; otherwise the breathing was good all over. She was troubled with night-sweats and headache. The pulse was 96; urine of specific gravity 1015, and free from albumen.

Upon admission into St. George's Hospital, the face was much flushed, the tongue yellow and coated, and the bowels confined. Vomiting was persistent, and the ejected food sometimes blood-stained. The abdomen proved to be much distended, but not hard, forming a palpable smooth swelling. Great pain, and tenderness on the slightest pressure were apparently felt at the pit of the stomach, and in every part of the abdomen or chest. Subjective pain at the lower part of the left side of the thorax was also complained of, increased on deep inspiration; and there was cough in the morning, accompanied by brown viscid expectoration, at times containing blood-streaks. On physical examination, dulness on percussion was discovered at the base of the left lung behind, and coarsish respiratory murmer at the apex of the right lung in front. The catamenia had appeared three weeks before admission. No vaginal discharge was complained of; and no local pain or morbid sensibility, etc., existed, which could be referred to the uterus or ovaries. The pulse was soft and weak and quiet; and the axillary temperature 98·5°. Her manner was somewhat sly and hysterical. She was fed with beef-tea and milk with lime-water, and constipation was met by blue pill and the compound extract of colocynth, and subsequently by senna draught. The infusion of calumba, with compound spirit of ammonia and bicarbonate of potass, was given twice a day.

On the 9th, she was much the same, vomiting all food and medicine. The pulse was very feeble, and 100 per minute; and the respirations 24 per minute. Calomel and senna were given; and later on, as no effect resulted, scammony and calomel and castor-oil enema were administered. Afterwards calomel and jalapine, and then enemata with sulphate of magnesia and confection of rue, were resorted to. On the 13th, the urine was found to be very albuminous; the tongue coated; and the vomiting worse, the vomited matter being occasionally streaked with bright-red blood, as if it came from the pharynx. The patient was very low and feeble. To ease pain and vomiting, I prescribed a draught to be taken every three hours, containing a quarter of a grain of extract of belladonna, and one drop of hydrocyanic acid, with syrup of ginger; and allowed fragments of ice to suck. Three ounces of brandy with water were ordered in twenty-four hours. On the 16th, the pain had continued very great in the hypogastrium; and the urine, which was very scanty, contained blood corpuscles, but no "casts" of uriniferous tubes. Hydrocyanic acid in three-drop doses was given in effervescing draught; and lime-water, and calomel, and jalapine, and subsequently croton-oil, as aperients; and, as but little ease followed, I ordered to the epigastrium a blister of the size of a five-shilling piece. On the next day (the 20th) the urine was found still to contain albumen, but to be acid, and was "smoky" in color. The face was flushed; and the pulse 84, and small. Still she had a cheerful appearance, and from the first no positive emaciation had been apparently produced. The day following, the blister was dressed with a quarter of a grain of meconate of morphia. Subsequently, one-fifth of a grain of morphia was injected subcutaneously in the arm, much pain being complained of along the œsophagus. On the 23d, a drachm of saccharated solution of *lime was given in* peppermint-water every two or three hours; and a

quarter of a grain of morphia, with one-sixtieth of a grain of atropine, injected subcutaneously; and on this day the urine was found free from albumen, which was looked for, but was never found in it again. Morphia was again injected subcutaneously, and beef-tea and milk were given as enemata, as she refused to take any nourishment by the mouth. Belladonna liniment was rubbed over the abdomen; but she indignantly refused to have this used, and also resisted the enemata. On the 27th, the respiration was 36 per minute: the pulse 84; and the axillary temperature 98·2°. Want of sleep was greatly complained of, and attempts to meet this were made by repeating from time to time the morphia injections. The patient greatly disturbed her neighbors in the ward by much noise, groaning, etc.; becoming irritable and angry, if checked or thwarted. The pain and vomiting and constipation went on in spite of treatment; and her condition was looked upon as that termed hysterical, all physical indications of disease in the lungs having entirely cleared off. Dyspnœa was, however, still complained of. The epigastrium was again blistered, and morphia applied, and the fœtid spirits of ammonia given. On December 6th, whilst the girl was apparently suffering in the same manner, the Queen passed the hospital on her way to open Blackfriars Bridge; she rose in bed to watch her out of the window, having been thought utterly unable to move, owing to pain. Whatever doubts one had previously entertained were now more or less removed; and I at once ordered her to be dressed, and to lie outside the bed. Dr. Pitman, as one of our Consulting Physicians, saw the patient with me, and agreed with me respecting the case. She still refused food, or vomited what was given to her. On the 25th, a letter was picked up on the floor, in the girl's handwriting, addressed to another patient in the same ward, and begging for food to be brought to her, and about this letter she greatly prevaricated. The epistle, a curious one, with the original spelling, is given in a foot-note. She continued to abstain from food offered to her, and lay groaning and moaning, being very impertinent, or as the nurse said, "saucy," to those around her. On the 31st, she passed a *healthy and ample evacuation* by the bowels; and this was observed on several occasions by the nurse. Subsequently, the noise she made was so disturbing, that she had to be moved into a separate room, and to have a nurse provided who should carefully watch her. She then took food such as arrowroot better. I also at that time for some days prohibited friends coming to visit her. The bowels were kept open by senna and oil enemata; and the hydrate of chloral was given in thirty-grain doses, with good effect, at night, on several occasions. One day, friends having been again admitted, I found the girl sitting up in bed, trying on a new colored frock. Valerian and ammonia, with aloës, etc., were given; and shower-baths for a week, on alternate days. She was also faradized along the back and limbs from time to time by Mr. Laking.

The baths were again omitted, owing to the appearance of the catamenia. As she became much quieter, she was allowed to return to the wards upstairs, but not to the same ward in which she was previously, as she had contracted a dislike to the nurse, who may have been a little impatient with her; and by degrees she was compelled to walk about, being repeatedly led into the middle of the room by herself, and left there to find her way back to her bed. She entirely ceased to complain of pain and to vomit: and gradually she ate ordinary food. I then ordered her to resume the shower-baths; but she so resisted this, that, upon my determining she should have them, she one day walked out of the hospital, and left it altogether. We have made inquiries about her since; and she wrote to Mr. Laking, saying that she only suffered from pain in her left side, and at times in the head; and that she would like to come up and see her friends at the hospital; at the same time expressing great regret at having "gone on so as she did."

Such is the case which I wish to bring before your notice; and you will recognise in it a good example of that perversity of will, that determination not to adopt means for recovery, and obstinate desire to be considered

an invalid, which may be termed "temper-disease," associated with, and complicating, so to say, symptoms of a graver character. The aspect and mien of the patient, the history of her previous symptoms, the constipation, tympanitis, the exquisite morbid impressionability, the deficient catamenia, and the constant vomiting, without any ascertainable cause for it, and this vomiting *unaccompanied by nausea*, in addition to the fact of the *temperature* being always found to be *natural*, conspired to mark the case as one embracing, at any rate, much of the hysterical element. The forgetfulness of all her ailments on the occasion of the Queen passing the hospital and the affair of the new dress, and the result of treatment also, evidently bore out this view. At the same time, the cough, the expectoration, (considering its character) and the physical signs met with on examination of the lungs, indicated that we had something more than ordinary hysterical symptoms to deal with, which probably had long been going on.

Possibly the history of the case may have been as follows. The girl, being by nature self-willed, with a "naughty" disposition, badly trained, too well pleased to attract and receive attention, of an hysterical temperament, and of a weakly physicial frame, may have "caught cold," which produced catarrh and some pulmonary congestion. This state under the injudicious and capricious care of attendants, with the above antecedents, may have originated that exaggeration of self-consciousness which developed into the condition spoken of as "temper-disease," accompanied by other symptoms of an hysterical character. [I have adverted to the character of the vomiting, alluding to the fact that it was not accompanied by nausea. This I would have you take notice of, as probably, when it is doubtful how much is hysterical in a given case, the absence of nausea may aid you in arriving at a right judgment.]

At the same time, although other symptoms drew our attention to the condition of the lungs, and made us careful in not overlooking any serious mischief that might exist, you will observe that, regarding the characters of the temperature of the body and other circumstances, I did not lay too much stress (in the illness) upon the lung-symptoms, as being distinct from the general condition. I could not help reflecting that, after all, the lung-trouble might be part and parcel of the general hysterical condition—one of its manifestations. We know well that affections of the pharynx and larynx, attended by cough, exaggerated secretion—in some cases, discharge of blood and local hyperæsthesia—may attend the hysteric state. I think there is no doubt that irritative symptoms of the respiratory organs of a character allied to the hysteric have before now been mistaken for indications of phthisis, and treated accordingly. We have proof that in this condition we may not only have pain more generally diffused, but also concentrated, as it were in isolated parts; and in addition, local redness, heat and swelling, and all appearances so often presented in inflamation. I could adduce a multitude of instances: but here, at St. George's Hospital, it will at the moment suffice to remind you of those observations of Sir Benjamin Brodie (with whose works, as St. George's men, you ought to be especially conversant) regarding certain hysterical affections. For example, you will call to your recollection those highly interesting cases of the results of nerve-irritation which he adduced. In one case, pain and inflammation in the testicle were caused by a calculus in the ureter; in another, effusion of serum took place into parts supplied by the trifacial nerve in cases of *tic douloureux;* in another, pain, redness, and tumefaction of the toes came on, as a result of neuralgia, alternating with neuralgia of the face; in another, local pain and inflammation attended neuralgia, and were amenable to the action of quinine; in another case, local pain and swelling, supposed to be of scrofulous character, in reality were referable to hysteria, and conjoined with hysterical attacks. He also mentions painful swelling of the skin, like aggravated urticaria, arising under hysteric influence. You may all remember cases of hysterical knees, mimicking organic alterations in those parts. Possibly you may have yourselves seen *cases of the swelling* of inguinal glands from irritation of the urethra.

All such instances show that under certain nerve-influences operating from a distance, we may have great vascular, nervous, and other disturbance in individual parts of the body, simulating ordinary inflammation; so that it must not be considered far-fetched if we suppose that, under certain conditions of the nervous system occurring in hysterical people, we may have such interference with circulation, secretion, and nutrition, in the substance of the lungs as in other parts of the body, as shall give rise to cough, expectoration, pulmonary crepitation, and a condition in which there is dullness on percussion over the chest. And, if so, may we not entertain the supposition that in the case before us we have an instance of the kind; the more so, as the whole of these symptoms gradually cleared off?

What Dr. Billing states of hysteria in general is especially applicable to instances of "temper-disease." He observes of it, "There is no disease which requires so much *discrimination*, *skill* and patience, as obstinate hysteria, unless it be that with which it has been too often confounded—*insanity*".—*British Medical Journal*, *July* 16, 1870, *p.* 57.

29.—EFFECTS OF CHLORAL WHEN EXHIBITED IN A CONTINUOUS MANNER IN ACUTE AND CHRONIC NERVOUS DISORDERS.

By Dr. William Strange, Physician to the General Hospital, Worcester.

Case 1.—*Congestion of Brain from Solar Heat.*—A young lady, aged 24, whilst on a visit to Ireland, after exposure to intense solar heat, had active congestion of the brain and its meninges, characterised by severe pain and heat at vertex, hot burning skin, quick pulse, vomiting, and total insomnia. These symptoms were treated by an Irish physician, by means of leeching, shaving, and blistering the scalp, mercurials, &c., with abatement of the urgent symptoms. The insomnia, however, remained, with total loss of appetite, and much depression. The muscular weakness was extreme. I recommended, from a distance, that the chloral should be tried, but it was not approved of by the gentleman in charge of the case, who had had no experience of the drug. It was attempted to subdue the sleeplessness, &c., by means of opiates, which failed entirely, their only effect being to derange the digestive organs still more. On the patient coming under my charge, the chloral was given at once, with the best effects. The pulse ranged at this time between 110 and 120, feeble, sharp, and quick. There was still heat at the vertex, although the skin had become cool and the tongue clean. She had also that quickness and sharpness of both the mental and physical motions characteristic of this affection, and no sleep. Twenty-five grains of the hydrate were given at bed-time, with the effect of producing a good night from the very first dose. When the chloral was omitted, that night was invariably a sleepless one. It was therefore continued for some time, and although the excitability did not give way at once, the pulse remaining sharp, at from 110 to 118, the appetite grew ravenous, the digestion being correspondingly rapid; the tongue remained clean all the time, whilst under the morphia it had been foul, and the appetite *nil*. Small doses of quinine with the bromide of potassium were now added, and the patient rapidly progressed to a good recovery.

Case 2.—*Concussion of Spine in a Railway Carriage.*—A tradesman, aged about 35, travelled from Rugby to London in a train which does not stop during the whole of that distance. From some defect in the coupling or the springs of the carriage, the passengers in it were shook and tossed to-and-fro, so that they were unable to retain their seats, and some of them stood the whole way to town, holding on by straps or woodwork to support themselves. This shaking up was followed in my patient within a few hours by partial insensibility and loss of memory, and, after a few days, with feverishness, numbness, and tenderness in the lower extremities, thickness of speech, inability to find the right word, and other symptoms

of partial paralysis. He was quite incapacitated for business, and there was complete insomnia. He obtained some relief by a visit to the sea-side and rest, but at the end of six weeks, when I first saw him, all the above symptoms were present in some degree, and he complained bitterly of the want of sleep. Ordered half a drachm of the hydrate of chloral every night, with bromide of potassium three times a day. The chloral at once gave him good nights, and the two sedatives combined restored him to himself in about ten days.

Case 3.—*Melancholia with Delusions—Insomnia.*—A young lady, about 30 years of age, took the hydrate of chloral for several nights in succession for the sleeplessness which frequently accompanies similar cases, other remedies being used to restore the functions of the liver and skin, which were defective. The chloral only procured interrupted sleep during its use; but after it was discontinued, healthy sleep became the rule, in place of the previous insomnia. I have witnessed this good effect of the hydrate in other cases.

Case 4.—*Inveterate Pains of a Neuralgic Character.*—A middle-aged person, much harassed by a large business, had suffered for the last two or three years from neuralgia of the nerves of the trunk and extremities, frequently changing its seat—the pain, when present, being intolerable. After exhausting almost all remedies but the right one—*i.e.*, temporary relinquishment of business—he learnt the use of the hypodermic injection of morphia, and it was his habit to have recourse to it whenever the pain became severe, sometimes several times a day. This relieved, but never cured, his pains. He was, at the time I saw him, anæmic, dyspeptic, feeble, restless, and sleepless. With some difficulty I persuaded him to give up the use of the morphia, and to take the hydrate of chloral at bedtime. He missed the soothing effect of the morphia greatly at first, but he was induced to persevere, and has not now had recourse to it for several months. The chloral, after a few trials, gave him better rest and sleep, which enabled him to battle with his pains by day without having to fly to the morphia. It was persevered in, and, with suitable remedies applied to the enfeebled digestive organs, chiefly small doses of strychnia, he soon conquered his dyspepsia. He has regained blood and flesh, and now does very well without either the chloral or the morphia. The principal credit I claim for the chloral in this case is that it enabled the patient to conquer the dangerous habit of imbibing morphia for every attack of pain, and so gave the system a chance of righting itself, which it could not have had whilst opiates were used in any form, as in this individual they were never well tolerated.

Case 5.—*Tumour, presumed at the Base of the Brain.*—A young lady, aged 24, had suffered for about eighteen months from the following symptoms:—Constant pain referred to the back of the head and nape of the neck; partial and variable paralysis of the right arm and leg; great dysphagia, liquids being forcibly rejected through the mouth and nose; speech thick, with hebetude of intellect and drowsiness, and yet almost constant insomnia. These symptoms had supervened soon after a somewhat unhappy marriage. I gave the chloral in half drachm doses for a few nights, but it failed to secure any good sleep, and, fearing some ill effect upon the medulla oblongata, it was given up. No ill effect, however, appeared to follow its temporary use.

To subdue the pain and sleeplessness arising from the application of a blister, I constantly order a full dose of chloral to be taken from two to three hours after its application. The patients have invariably passed good nights, and awoke with the vesication completed. Faceache from decaying teeth, or from abscess of the gums, has also yielded to the sleep-compelling influence of the hydrate.

Case 6.—*Obstinate Chorea.*—A young girl, aged 17, the subject of long standing and obstinate bilateral chorea, had been treated during many *weeks of the* present spring with the usual remedies—tonics, &c.—without

much effect. She was not anæmic, but thin and haggard from the constant jactitation and loss of sleep. Placed under my usual treatment—*i. e.*, a liberal allowance of wine added to good diet—the chorea still resisted and the girl became very much reduced. Sleeplessness was a marked feature of her case from the beginning. At first the chloral was given in half-drachm doses at night, with the effect of procuring some sleep, but with no abatement of the choreal movements by day. I now resolved to try the effect of keeping the girl under the continual influence of the chloral. She was ordered to take eight grains three or four times a-day. This was afterwards increased to eight grains every four hours throughout the day and night. This treatment was continued for nine days, by which time all choreal movements had entirely ceased. The girl was excessively drowsy and languid all through the day, but ate well, and the digestive functions were not interfered with. After a little quinine and iron to recruit her strength, this girl left the house quite restored.—*Medical Times and Gazette, Sept.* 17, 1870, *p.* 334.

30.—CHLORAL IN CASES OF INSANITY.

By G. B. Wadsworth, Esq., Assistant Medical Officer, Suffolk County Asylum.

Having read many inquiries and suggestions as to the best mode of administering the hydrate of chloral, I beg to offer the following cases taken from the case-book of the Suffolk County Asylum, within the last three months, and shall be happy to see them inserted, if of sufficient value.

Case 1.—H. M., male, aged 51, was admitted May 21st, for the fourth time, in a very excitable state from recurrent mania. With ordinary diet and attention to his general health, he improved sufficiently to go to work. On the 18th of June, I was called to him, as he had suddenly when dressing in the morning, tried to jump through the window. I found him in every way suffering from acute mania. He would take no medicine; but when asked to take a glass of porter, said that he would. Sixty grains of chloral were administered in porter; and fifty minutes afterwards, he was in a calm sleep, which continued nine hours. At seven o'clock he awoke and wanted something to eat; he took meat, bread, and porter, with forty grains of chloral. This was followed by a good night; he slept ten hours, awoke hungry, and took food plentifully. His bowels acted well. He has since continued quiet, and is now approaching convalescence, and again commencing work.

Case 2.—M. A. B., female, aged 19, was admitted June 9th. She was cruelly bound hands and feet, and was immediately released and placed in the padded room. She was suffering from acute mania. She refused food with obstinacy, but after some little time called out for water. She was induced to drink a glass of porter which had sixty grains of chloral dissolved in it. In forty minutes she was in a calm sleep, which lasted ten hours. She awoke hungry, and had beef-tea, and another glass of porter with forty grains of chloral. She has continued taking the chloral in porter three times a day, in doses gradually decreasing to fifteen grains, with marked improvement, and is now recovering.

Case 3.—R. B., female, aged 59, was admitted June 22nd. She had all the symptoms of melancholia canina. On my entering her room, she was couched in one corner, but came towards me on her hands and feet, barking savagely. Seeing the nurse with a glass of medicine in her hand, she rushed at her. As I could make no examination, I could only judge the pulse to be over 150 per minute. On the partial subsidence of violence she was induced to take a glass of porter with sixty grains of chloral dissolved in it. In fifty minutes she was in a calm sleep, which lasted eight hours; pulse 84, respirations 18 per minute. She was then willing to take support in sufficient quantity, and had porter, with forty grains of chloral dissolved

in it. This produced a good night's sleep, which has continued uninterruptedly each night, the chloral being repeated in decreasing doses to fifteen grains three times a day. She is now gradually improving, the unnatural noise not having been heard since the third day from her admission, and she now converses rationally.—*Brit. Med. Journal, July* 16, 1870, *p.* 62.

31.—REMARKS ON THE ACTION OF THE HYDRATE OF CHLORAL IN PARALYSIS OF THE INSANE AND OTHER FORMS OF INSANITY.

By Dr. WILLIAM MACLEOD, Deputy Inspector General of Hospitals and Fleets, Royal Naval Hospital, Great Yarmouth.

[What is wanted in cases of insanity is an agent which will not only give good rest by night, but which, if given in smaller quantity by day, will soothe and calm the patient, and act on the sensory ganglia, which evidently are the parts of the nervous tissue chiefly involved. Hydrate of chloral will, in a great measure, fulfil these ends if properly and judiciously administered.]

In all the eight destructive cases, with doses varying from fifteen to thirty grains, good sleep was procured for seven and eight hours, and not attended by loss of appetite, constipation, drowsiness, or morning sickness. In most of the cases the sleep was followed by a general calming influence, more so than after any other hypnotic, and which continued for several hours. One patient required forty-five grains to cause sleep when in the sick ward; but place the same patient in a dark cabin by night, and twenty grains will induce sleep. This patient is in the first stage of the disease, full of exalted delusions, very noisy, shouting to such an extent as to be heard all over the building, violent and destructive.

At night he is placed in a cabin by himself; fifteen grains are given him, and repeated every two hours until he sleeps. He passes a good night, and he is removed next morning to the sick ward, where he is washed and dressed. During five days of the seven he is quiet and easily managed, and this calm state often continues until bedtime. On other mornings he is not, however, quite so well; he is like a giant refreshed with sleep, and will in a short time upset the ward, tear his clothing, and destroy some of the furniture. Let ten or fifteen grains be given him, and it is astonishing how soon he becomes quiet, but he does not sleep. I prefer to see this calm condition produced during the day, rather than sleep, as in this comparatively good state he can be sent to the airing ground with the other patients, and practically it is found that he gives no trouble. One morning I was walking in the quadrangle, when this man began to shout, and attempted to break one of the windows. I at once visited him and got him to take ten grains, and in a quarter of an hour he became calm, and began to hum hymns and say his prayers. In order to test the beneficial action of chloral, a few mornings ago I purposely refrained from giving it to him, when he began to show symptoms of violence, and, instead of giving it, I ordered an attendant specially to watch and take care of him. He soon became unmanageable; ten grains were given which brought him round to his ordinary quiescent state. He began to take chloral on the 9th of March, and it has been continued to the 1st of July.

During the first thirty-one days, 815 grains were administered, giving him a daily average of 29 grains; for the next fifty days, 1,130 grains were given, the daily average being 22 grains; and from the first to the 20th of June, 490 grains were taken—the daily average was now slightly increased, as 24½ grains were required.

It was then given up, in consequence of symptoms of prostration supervening, which, however, very soon passed away; and during the 21st, 22nd, 23rd, and 24th, he was so very quiet by day, and slept so well by night, *that it was not necessary* to give any. He seemed during this time, as if

under its influence; took his food well; appetite being, I may say, voracious. This, however, is a symptom of the disease in many instances. But in all patients who are under the influence of this medicine the appetite is found to be excellent.

On the 25th he became so very restless and violent that it was determined to give chloral as before. He required, on the first night, 45 grains given at intervals of two hours, before he became calm; and up to the end of June, 20 grains daily were found to be sufficient. Between his entrance on the 5th March and the end of March, he lost 8 lbs. in weight; since then he has held his own up to the 16th June, and from that date to the 1st of July he has gained ground, looks better, is stronger, and walks with a firmer step.

Another patient, who is far advanced in nerve-softening, being demented, noisy, destructive, and who for three days and three nights before he took chloral did not sleep a wink, required 45 grains before he slept, and then slept for eight hours. During the following three days and nights the calming influence continued, and he slept at intervals, the attendant feeding him when awake. At the end of the three days he again became restless, noisy and destructive; and on the evening of the fourth day I began to administer 15 grains every two hours until he had taken 60 grains, when sleep supervened. He slept at this time nine hours, and it was followed by a calming and soothing effect for three days and nights. Since then a small quantity—some nights 15 grains, other nights 22 grains—causes good sleep, and of late the quantity has been reduced to 10 grains.

It is not now administered every night, but given when the patient begins to show symptoms of restlessness. It is found that if it is neglected to be given when these symptoms present, and he is allowed to be noisy for a whole night, or even for a few hours, a much larger dose is necessary in order to calm him. What answers in each individual case must be discovered by experience, and it is individual treatment that will prove beneficial. He has had from first to last 1,020 grains without a bad symptom.

I might proceed and state the individual treatment of the other six destructive cases, but it would be, in a great measure, a repetition. It is not only in the noisy and destructive cases that this remedy will be found useful, but also in the treatment of those patients who, although not destructive, are full of exalted delusions, and at stated periods become excited and troublesome. I shall mention one case: he is full of exalted delusions; one day expecting to be Governor-General of India, and another day to command the Channel Fleet. He is constantly subject to abnormal sensations that certain portions of his body are removed from him, stomach being torn out of him, and a dragging sensation at his heart. Hallucinations of hearing are common as well as illusions of vision. Memory is very defective. For his own safety he requires to be continually under observation. He therefore sleeps by night under the observation of the watch; when awake by night he is abusive of every one, accusing the attendants of causing the abnormal sensations. So fully impressed is he with the belief that they cause these sensations, that whenever he sees me he makes complaints against one and all of cruel treatment. By day it is a repetition of the same complaints, with an occasional growl against an ungrateful country for having forgotten such a distinguished servant. This patient, before his illness, was one of the most amiable of men, but before he began to take chloral his language became unbearable. On the 3d of April he began to take 15 grains at bedtime in a glass of brandy and water, and it has been continued daily until the 27th June, 735 grains having been taken during that time without a bad symptom. His nights have been excellent, he has not, on any occasion, disturbed the other patients, and in the morning, instead of being exceedingly troublesome to every one, he is quiet and civil to all. This happy state continues until after dinner, when the influence gradually passes away and he gets into a talkative mood. As he is, however, at this time in the open air, it is not necessary to repeat the chloral. I *have no doubt ten grains* at this time would calm him: my

desire is to reserve it for a more advanced period of the disease. Digitalis in this patient soon caused an intermitting pulse, and hypodermic injections of morphia produced sleep for a few hours, but as soon as the sleep passed away he was worse than before, particularly as to the abnormal sensations, and he required purgatives to act on the bowels. On the other hand, under the chloral treatment all the natural functions are performed regularly; he has gained flesh, and is certainly more rational.

It often happens that after a patient has passed through the first stage of the disease he gets comparatively well; the exalted delusions vanish, and he becomes comparatively rational, although the external physical symptoms remain, such as thickness of speech and diminished motor power. Many thus get so well, that when friends visit them, they find them so much improved that they are deceived, and flatter themselves that they are quite well. Patients in this state are most uncertain in their conduct; suddenly they break out with their delusions. As, for instance, such a patient came to me two days ago, informing me he had just received a message from heaven that the Saviour was to appear on earth at twelve noon to-day, and he was to attend him. He became restless and excited during the rest of the day, and more so as the evening advanced. At bedtime he had 20 grains given him in half a tumbler of porter, and this has been repeated as often as the exalted delusions and other symptoms return. These exalted delusions, commonly called mental, are as much physical, and the result of diseased action in the membranes, convolutions of the brain and central ganglia, as the diminished sensation and motor power are the result of softening of the cervical and dorsal portions of the spinal cord.

This remedy has been found equally useful to the patients who are permanently confined to bed; who are perfectly helpless, but who are noisy, and can destroy bedding with their fingers and teeth; and my present impression is, the more helpless the patient is, the less does he require of the medicine, if it be given whenever he begins to give evidence of an inclination to be noisy.

In the cases mentioned the daily average quantity of chloral given, instead of increasing has diminished, while keeping up the hypnotic action by night, and quiescent state by day. This class of patients was previously treated in a great measure by constant and careful watching, by digitalis alone, or in combination with hypodermic acid; by hypodermic injections of acetate of morphia; by belladonna, hyoscyamus, oxide of zinc, bromide of potassium, stimulants, and plenty of exercise. Good nights were in many cases procured; but I could point out several instances where no treatment availed, and even the stormy and rugged path to the grave could not be calmed or made smooth. Careful watching and nursing are as necessary as ever, but with the assistance of chloral it is comparatively made easy. The second case mentioned above was, before the administration of chloral, a most troublesome one. Digitalis, when given, calmed him for the time, but acted as a powerful depressing agent. Hypodermic injection of acetate of morphia, although it caused sleep, produced great irritation of the stomach next morning, so that it had to be discontinued. He was also very destructive; now he is quiet, easily managed, has gained flesh and strength, and certainly can walk better.

From the rest induced in one and all, a great change for the better has taken place, and I am able to say, in one word, that during the last four months not a rag has been torn, nor an article of furniture destroyed. In the cases under consideration the bowels, as a rule, were obstinately constipated, there being a total want of peristaltic movement, requiring turpentine enemas twice or three times a week, as well as the frequent introduction of the catheter; since they have been brought under the continued influence of chloral purgatives are seldom used, and no catheter has been required, nor have I found it necessary to feed any of them by stomach-pump. I do not ascribe the good change to any direct curative action of *the medicine*, knowing as I do now some of the more important pathologi-

cal facts connected with this disease when once it has made progress; but I attribute it to the improved rest by night, and calming influence by day, together with the arrest, in a great measure, of the constant waste, not only of the nerve-tissue, but of all the tissues. Exhausting exercise or labor of any kind is, in my opinion, very hurtful; the quieter a patient can be kept the better. Whether this treatment can be carried out for any lengthened period, and if so, whether it will be attended by extending the lives of such patients, remains to be seen.

All the above facts force one to conclude:

1. That in paralysis of the insane, where the patients are destructive and violent, the judicious administration of chloral acts as an excellent hypnotic by night and soothing agent by day.

2. That under its action the patients have been free from destructive habits, and have gained in weight and strength.

3. That in one case as much as 2,810 grains were taken during ninety-five days, the daily average taken being 30 grains, with no bad symptoms. In a second case as much as 2,435 grains were taken during 122 days, being at the rate of 22 grains daily; when the patient gave evidence of prostration. A third patient took 2,380 grains during eighty days, the daily average being 20 grains, with no bad symptoms. A fourth patient took 1,362 grains during sixty-seven days, the daily average being 20 grains, with no bad symptoms. A fifth patient took 501 in twenty-four days, giving a daily average of 25 grains, with no bad symptoms.

4. That under it the action of the bowels and bladder have improved.

5. That in no case has there been a refusal of food; on the contrary, the appetite of the paralytic patients increased.

6. That patients suffering from abnormal sensation derived much benefit from it.

7. That in patients subject to hallucinations of hearing, with suicidal tendencies, it has cut short the hallucinations.

8. That in patients liable to hallucinations of hearing, and under their influence becoming excited and noisy, it has produced calm.

9. That in patients with a propensity periodically to maim and hurt themselves, the desire has passed away under the influence of chloral.

10. That in patients who suffer incessantly from voices, it has been given with partial benefit only. This refers to patients who were aware that the voices depended on morbid sensations.

11. In certain cases of melancholia benefit was derived from its administration, and convalescence advanced.

12. That in another case of melancholia with extreme depression, and the intellect being good, no permanent benefit was derived, except that under its administration the bloody exudation from the stomach completely disappeared.

13. That the greater the disorganisation of the brain and cord (as judged by the symptoms, and especially by thermometrical observations) the sooner does the symptom come under chloral action.

I have not given the thermometrical observations, as they would make the paper too long.

In these remarks I am fully borne out by the assisting staff surgeon of the hospital, Dr. Wheeler, who has with me carefully watched the progress made by the different patients under treatment.—*Practitioner, Aug. 1870, p. 66.*

32.—CASE OF HYDROPHOBIA.

By Dr. Thomas Davidson.

[It appears that there are members of our profession who doubt whether there really is such a disease as hydrophobia. It was, however, noticed by Aristotle in the dog, and described by him 320 years before Christ.]

On May 20th, 1870, Thomas Cowan, 8½ years of age, was bitten by a terrier dog. The boy was passing quietly along the street on his way home from school about midday, when two ladies followed by a dog came out of a house a short distance from him. The dog without any provocation instantly sprung at him, pulled him to the ground, and bit him severely in various parts of the body. I saw him about twenty minutes afterwards in the house of a gentleman who witnessed the accident, and had assisted in taking the dog off the boy. I was told by the person who came for me that the wounds were bleeding severely, and on approaching the house where the boy was, I noticed a considerable quantity of blood on the street. I found him pale and faint from the shock and loss of blood, but the hemorrhage had ceased. After he drank a cup of tea the faintness speedily passed off. I dressed the wounds in a temporary way, and had him taken home in a conveyance to his mother's residence and completed the dressing. I found an extensive lacerated wound extending from the outer angle of the right orbit to near the centre of forehead, and embracing the entire eyebrow and upper eyelid, which were hanging as a flap near the nose, and partly exposing the globe of the eye. The dog's teeth must have pressed upon the latter, but it was not perceptibly injured. There were also several severe wounds all over the forehead; in the centre there was a deep indentation down to the bone, evidently done by a large canine tooth. There was also a lacerated wound in the chin. On examining his left arm I found several teeth marks on both sides, the dog having had a firm grasp of the arm in his mouth, the marks of the teeth of both jaws being quite distinct. The canine teeth had entered deeply into the arm. On the right thigh there were also several deep wounds.

The owner of the dog being present, assured me there was no disease about the animal, it never having shown any symptoms of rabies. To prevent it injuring any other person it was shot, after it had resisted the action of a powerful poison, which had been given for the purpose of destroying it. The wounds from their situation and number rendered excision and cauterisation out of the question. I therefore washed them carefully and applied carbolic acid, replaced the flap, securing it by wire sutures, at the same time directing hot poultices should be applied to the different parts until the evening. I at that time removed them, substituting a mixture of linseed oil and carbolic acid. On visiting the patient next morning I found him going on very well; his general health was good, there was no fever, the wounds presenting a favourable appearance, and healed perfectly in about ten or twelve days without the least deformity about the eye. The boy got out of bed occasionally after the eighth day, and being a cheerful, happy little fellow, he played about the house, showing no anxiety or nervous depression. After the twelfth day, the wounds having quite healed, he was allowed to go out and play about the doors with his companions for a short time daily, the weather being warm and genial. I had never mentioned that hydrophobia was likely to result, nor had I any dread of its appearing in this case, as no one considered that the dog was affected by canine madness. The patient's mother, and his aunt, who resided in the same house, assured me it had never been mentioned to them or the boy that such a dire disease was likely to follow, nor was he at any time either annoyed or frightened after being bit. On Sunday, June 5th, he appeared in perfect health, and was quite cheerful and happy. A fearful change, however, was shortly about to take place. On June 7th, eighteen days after the accident, I was called at eight o'clock in

the evening to see him. His mother informed me he had complained all that day of pains about the neck, head, and face, but not particularly about the bitten parts. Although he had been able to amuse himself with his companions as usual about the doors, he had taken very little food during the day, and could not take his tea in the evening. I found him in bed suffering from intense fever and vomiting, which I was informed had come on about an hour previously. The pulse was 130, hard, and incompressible; tongue clean: skin particularly hot and dry. The symptoms indicated severe functional fever, yet there was an indescribable appearance which I thought I had never seen before in any case. When I asked him if he had any pain he replied he had pain in his head. There was no thirst, but his mother informed me on enquiry that he had drunk a little tea, which he swallowed without any difficulty. I prescribed a mixture composed of aqua acet. ammon., spt. æth. nitros., vin. ipecac., to be given frequently in warm water and sugar, directing at the same time that the extremities should be occasionally sponged with tepid water and vinegar. On visiting him on Wednesday morning the fever had somewhat abated, the vomiting had ceased during the night, the pulse was 120 and firm; the tongue appeared as if it had got a coating of thin white glistening varnish. A laxative was administered, and the mixture continued. The symptoms remained unchanged until early on Thursday, the 9th. I saw him about 7 a.m. His mother stated he had scarcely slept during the night, having been extremely restless, tossing about the bed, and changing his position every few minutes, and had not been able to swallow anything after two or three o'clock in the morning. I offered him a teaspoonful of tepid milk; he readily opened his mouth, but in a quick hurried manner, the moment the fluid touched his tongue or palate, it was instantly ejected with force. Being at the same time seized with a fit of suffocating spasm, he sobbed or sighed heavily, and threw about his arms. His features were much convulsed, and expressed the greatest dread and horror; the muscles of the larynx, pharynx, and trunk all became agitated by convulsions, which lasted for about a minute. After the fit had subsided his features became quite natural, and indicated very little appearance of disease or suffering. Nor was he either excited or talkative, as has been seen in some cases of the same disease; his intellect was unaffected. After waiting a short time I breathed gently in his face, when the same sobbing, choking, and convulsed condition came on as when he attempted to swallow fluids. I then informed his friends it was a decided case of hydrophobia. He could now, and at any time during the progress of the disease, open his mouth freely, and protrude his tongue when requested to do so. The term hydrophobia —dread of water—was not very applicable in this case, as he seemed to have no actual dread of it, as he a short time after this asked for a drink of water; the act of deglutition and remembrance of the pain and difficulty in attempting it caused dread, as I observed. Although he asked for fluids, when they were presented he suddenly pushed them away, and said he could not swallow. Pantephobia (a fear of all things) or phobodipson (fear of thirst)—names given by ancient writers—seem more accurate. During the course of the forenoon I asked Drs. Cahill and Gracey to see the case with me. One of these gentlemen, feeling the patient's pulse with cold fingers, instantly threw him into the convulsed state before described. I noticed the application of the patient's own finger to his face produced the same effect. The instant it came in contact with the skin he started as if he had received a sharp shock of electricity; he sobbed, threw his arms out, and the usual convulsion of the face and trunk followed. Having directed one of the attendants to pour water from one vessel to another in such a position as he could not see the water, the sound alone produced the same dreadful symptoms.

The medical gentlemen named entirely concurred with me in my views of the case, and it was mentioned in the discussion which followed that the fits did not resemble tetanus, epilepsy, apoplexy, or convulsion in any form which we had ever witnessed during a practice extending from twenty

to thirty years. With respect to treatment, we had little faith in any known remedy, believing that no record exists of a single recovery from this fearful disease either by art or from the efforts of nature when the symptoms of the malady are fully established and well marked. Chloral was spoken of, but as he had lost the power of swallowing it was never tried; it would possibly have proved of as little efficiency as any of the various remedies which have been tried, as its effects seem to be chiefly upon the cerebrum; but from what I saw in this case I am led to conclude that the spinal nerves are more implicated than the cranial. I had the bowels freely moved by a purgative enema; a dose of calomel, scammony, and jalap was given in divided doses, mixed in stiff jelly, which he masticated and swallowed without much difficulty. A beef-tea enema, containing tinct. opii, was directed to be gixen, but had to be laid aside, as it brought on the fits. A heated-air bath was extemporised by getting a tin tube made about four feet in length, with inverted funnel-shaped mouth. A lobster "creeve" was obtained. After removing the "net" the frame was placed over the patient's body, and covered with the bed-clothes. Placing a spirit lamp below the funnel, the heated air was conducted within the frame, and an excellent air-bath was established. A slight moisture over the surface of the body was soon produced; the bath was continued for several hours. The powder moved the bowels freely; the tongue assumed a more natural appearance; he seemed more tranquil, and the fits not quite so frequent; and he had eaten a small biscuit during the afternoon. Many spontaneous attacks occurred during the day, but care was taken not to induce them by any exciting cause. About 7 p.m., the fits becoming more frequent and severe, inhalation of chloroform was now tried, and persevered in for two hours; but, instead of soothing him, it seemed to have the opposite effect—complete anæsthesia could not be induced for more than two or three minutes at a time. Three ounces of Messrs. Duncan and Flockhart's best chloroform were used, then discontinued. The fits were so severe and the struggling so great, he had to be kept in bed. A sheet was fixed over the frame of the bed for that purpose, and was found quite effectual. As the disease progressed he became more exhausted, the pulse weak and irregular. He continued perfectly sensible until the last. When I asked him, a quarter of an hour before his death, if he felt any pain, he answered instantly that his eyes and his hair were painful. His eyes, for an hour before dissolution, appeared projecting from their sockets; the eyelids retracted in a perfect circle, giving to his countenance a look of dread and horror which was painful to witness. The muscles of the scalp were also affected with spasm, causing his hair to stand almost straight out. There never appeared any unusual amount of fluid about his mouth, and nothing like "slaver" till an hour before his death, when he frequently vomited about a table-spoonful of viscid, clear mucus slightly mixed with froth. Occasionally a spot of blood was observed in the matter vomited. He complained that the light of a candle pained him. I left him at 12.30 a.m., and was informed that ten minutes afterwards he vomited about a pint of dark-coloured blood, when death quietly took place in a few minutes without any convulsion, on the twentieth day after the accident and twenty hours after decided hydrophobic symptoms were presented.—*Medical Times and Gazette, Aug.* 27, 1870, *p.* 234.

DISEASES OF THE ORGANS OF CIRCULATION.

33.—PALPITATION: ITS DIAGNOSTIC VALUE.

By Dr. J. Milner Fothergill, Senior Resident Medical Officer of the Leeds Public Dispensary.

Though the oldest known symptoms of heart disorder, palpitation has never had any exact diagnostic value attached to it. It has been hitherto regarded as excited or increased action of the heart, without any reference

to its causation. It may be fairly questioned, whether this even is in accordance with fact. From a careful examination of the subject for some time past, I have been led to regard it as solely diagnostic of a disturbance of the balance which exists between the blood to be driven by the heart and the power to drive it; and that, too, in the direction of cardiac inability. This impression is constantly growing stronger. The idea is founded not only on its exciting causes, but also on the known action of the remedies which enjoy the greatest reputation for efficacy in allaying it. It appears to be the first evidence of over-taxation of the heart, of which irregularity (in time, not in volume—that rather belongs to mitral regurgitation) is the next, and intermittency the most serious. This idea may appear more or less novel, but probably less. Having been for some time past engaged in an investigation into the mode and manner of production and action of heart disorder and disease, it may not be presumptuous to offer my conclusions, and why I have formed them, to the notice of the profession.

Palpitation, then, to commence broadly, is usually associated with exertion, nervous excitement, or general exhaustion, no matter how produced. It can be no subject for doubt that many persons know palpitation only after excitement in a heart structurally sound, others after exertion in a heart structurally diseased. But in each it may be the chief burden of complaint; indeed, in the person with the sound heart it may be more severe and alarming. Though connected with such apparently different conditions, its diagnostic value is unaltered. It has been regarded as over-action; the truth seems to be, rather, that action is more apparent. The extreme of healthy action is utter unconsciousness that such action exists. The evidence of that action, then, is scarcely to be regarded as an evidence of power. Though hypertrophy and palpitation are often found together, palpitation is much more intimately associated with dilatation. Hypertrophy evidences that there is some disturbing force in operation by which increased action and power on the part of the heart are called for; otherwise hypertrophy could not exist. We are unacquainted with any growth of muscular fibre which is not occasioned by increase of demand upon it. In the silently acting organic muscular fibre this is most apparent. Thus it occurs in the stomach before a pylorus narrowed by scirrhus; in the bowel in the presence of a chronic obstruction; in the bladder from prostatic change or stricture. So in the heart we have hypertrophy from the demand for it, and can no more conceive a spontaneous un-called for hypertrophy of muscular fibre in the heart than anywhere else. Palpitation evidences the demand and indicates the compensation to be still incomplete. But it is connected with the demand on the heart; not called forth by the increase of muscular power. Of old, hypertrophy was regarded as a disease, and was met by bleeding and starvation. It was regarded as an abnormal development of power, and, as such, was attacked as a disease. We now know that it is a compensatory growth; and, consequently, the more perfect the hypertrophy the less does the patient or any one else hear or know of it. So palpitation, which has been regarded as over-action, and treated accordingly, will soon be seen to be an evidence of the muscular power being taxed or wanting, and that it is connected with the want of power, not the excess of it. Palpitation is like the pain in the distended bladder, an evidence that the muscular action is called on; but it is not that it is too strong for the work, but that it is unequal to it. In dilatation, with or without valvular disease, is palpitation most common in the structurally altered heart. It cannot, then, be an evidence of over-action, as the old theory ran; because then the palpitation should be absent on exertion and present in quietude. Now we all know that such is not the case. In this condition effort calls out palpitation, as occasioning an addition to the heart's labour. The muscles cross the arteries and impede the flow of the blood. Wardrop even called this the musculo-cardiac function, and thought it beneficial by filling the heart's chambers with blood, which it most unquestionably does. But in dilata-

tion the essence of the disease is that the ventricles are always too full, and never completely emptied. The ventricle, no longer able to close completely in systole, is partially full to commence with on diastole, the distended auricle and veins drive in the blood under increased pressure, the fibres become overstretched, distension results, and contraction is impaired. "Dilatation of the heart is a purely mechanical effect of over-distension." Palpitation, then, ought, on the old theory, to act as a curative agent in dilatation, and ought consistently to occur when there is no great call on the heart—that is, during quietude, when the demand is the least. But notoriously it occurs in exertion, when the impeded flow of blood would act against this over-action. This creed is untenable, and may be left without further comment to the decision of my readers. In the structurally diseased heart effort is the common cause of palpitation. A species of balance has been struck between the power of the heart and the work to be performed; the system has lowered to meet the heart; a levelling-down process has gone on; and effort, by disturbing this balance, evokes palpitation. Palpitation evidences that the muscular fibres are making an effort to meet the demand on them; not that they are inordinately successful. It is laboriousness, not excessive power, that is indicated by palpitation. When the heart is acting excitedly, as in exertion, it is only when that exertion has been excessive that anything like palpitation is evoked. Take a "striker" (a fore-hammerman], for instance, after a "heat." All his muscular energy is called out to accomplish all that it is possible to do before the metal cools. Take him at the finish, with the perspiration rolling down, panting, exhausted for the moment, and you find his heart palpitating, so violent is its action from the recent strain upon it. But its effect is visible on the pulse, which is full and bounding, and in strict proportion to the action of the heart; and there it differs from palpitation. In excitement a similar violent action is seen sometimes, but the arterial pulse is again affected and reveals the excitement. But these conditions are not true palpitation. According to the old theory, palpitation ought to occur to the striker when unemployed, as the heart then could not have enough to do. Of course some readers may say, "And so it does." Certainly in time it does, as it does in anyone else where violent calls on the heart are inducing structural change. According to the old theory, the heart, accustomed to exertion, ought to palpitate whenever a lessened call on it left it with some spare power, which is let off harmlessly as palpitation. So also in exertion the heart's action ought to be feebler in proportion to the obstruction offered. Whether what is consistent with the old theory is consistent with experience may be fairly questioned.

But, again, it may be said that palpitation occurs from excitement, and is nervous. But when we have eliminated the cases of Bright's disease and those so-called hysteric conditions accompanied by a contraction in the arteries and arterioles, the instances will be found to be very few, and to depend mainly on the presence of poisons, either taking their origin within the organism, as in bile-poisoning, for instance, or from the action of external agents, as nicotine. It is possible that there may exist conditions essentially nervous, where a derangement of the balance of nerve-supply to the heart, a disturbance of the balance existing between the cardiac gangila of the sympathetic and the inhibitory action of the pneumogastric, may occasion palpitation; but of these conditions we do not yet know any thing clinically. Nervous palpitation is a refuge in time of trouble only too commonly. Increasing knowledge of pathological conditions, and the advance of our acquaintance with the mode of action of disordered function, are shedding much light on what have been hitherto obscure cardiac derangements. Firstly came the connection between disease of the kidneys and heart-changes. Traube attributed them to obstruction to the flow through the renal artery acting on the general systemic circulation; then came the idea of altered blood—in plain English, increased friction; and now Dr. Geo. Johnson has demonstrated a thickened muscular coat in the arterioles. The last theory supposes that the

irritant action of the products of histolysis in the blood gives rise to a spasmodic action of the muscular tunic, in time leading inevitably, by the well-known law, to hypertrophy. Thus still greater obstruction is offered to the flow of blood, and the heart still more taxed. Thus when the blood is more than ordinarily laden with the products of retrograde tissue-metamorphosis, the excess irritates the arterioles, and more than usual contraction follows, and, as a consequence, impeded flow and palpitation. The balance existing between the altered muscular tunics and the heart's walls, also altered, is disturbed and the accommodation interfered with, and the extra call for action evokes palpitation. As to the frequency of palpitation among those suffering from Bright's disease, and its occurrence along with evidence from other sources of an accumulation of retrograding material in the blood, as a question of fact, I must leave to the experience of my readers.

In hysteria and allied nervous disorders we have palpitation without evidence of any structural change. So also it occurs in persons of bilious temperaments; it follows excessive tobacco smoking in nervous or weak persons, as it may also follow the administration of other agents which affect the heart. Whenever there is disturbance in the balance of nerve-forces it may occur. Whenever the heart is acting under disadvantageous circumstances it is never long absent. Thus palpitation follows displacement, either transient or lasting. It persists in displacement from accident or disease. It is a common concomitant of a loaded stomach or great flatulence. Indeed, it may arise from any cause which, by pressure on the diaphragm, diminishes the space for the heart and impedes its beat. This looks rather like a laborious action than over-action or spare power. The heart is placed at a disadvantage, and palpitation takes the place of normal quiet contraction.

Palpitation is intimately associated with a disturbed or altered innervation; whenever, in fact, there is a disturbance in the balance of the heart's nerve-forces it may occur. In many cases of nervous palpitation—it would perhaps, be thought premature to say all—no increased action is felt in the arteries, great or small. Whatever nerve-derangement may induce the palpitation, there is no corresponding action in the arteries. The condition may be analogous to, and even homologous with, the disordered action of Graves' disease. In Graves' disease, and in some cases of chorea, the whole right ventricle seems violently thrown against the chest-walls with a large and forcible impulse; the impulse too, being in the normal locality, not the large diffuse beat of dilitation a rib or so lower than natural. Certain it is that, not uncommonly, a violent action of the heart exists where the pulse is small and even unusually constricted. This condition is common in women. It is evident, then, that, in this condition, where even the sphygmograph may not detect an unusual action in the arteries, the heart's action must be met or neutralised by some altered condition of the arteries. In some cases, too, there is no excitement in the large arteries, showing that the arterioles are not the only part affected. In hysteria we usually see this condition: the heart is acting with evident violence against no perceptible necessity. The patient is cold, the pulse small, the arteries evidently contracted, and the state of arterial tension is followed by a free flow of limpid urine, the result of an increased pressure on the glomeruli of the kidney. This condition has met with much elucidation from experiments performed by Ludwig, Thierry, the brothers Cyon, and von Bezold. (See "Carpenter's Human Physiology," 7th ed., p. 269.) In these experiments an excited action of the heart was evoked after every nerve-communication had been severed between the heart and the organism, the heart only being attached by its vessels. Irritation then applied to the medulla oblongata induced violent action of the heart, increasing its pulsations in rapidity. When only a small portion of the nerve-supply, the accelerator nerve, was left, there was increase of power as well as of rapidity—*i. e.*, typical palpitation.

These experiments have thrown much light on the pathogeny of nervous

palpitation, and from them we can easily see how and when long-continued tissue-changes will result. Thus is produced the nervous hypertrophy of writers. When, then, we find the arteries unaffected by the heart's action, it is evident that that action is met or neutralised by a condition existing in the arteries. That this condition is connected with vaso-motor changes in the calibre of the arteries and arterioles we are fast learning to see. Thus in nervous hypertrophy we see the effects of opposition offered to the flow of blood continued for some time. In nervous palpitation we see evidence of an extra demand on the heart, and of action to meet it. In nervous palpitation we are no longer driven to imagine a tumultuous action of the heart's fibres against each other—a condition which it is not easy to imagine, much less to offer any proof of. In the uterus sometimes is seen a want of synchronicity between the action of the different fibres, which was supposed to resemble palpitation; but even then it was merely a spasmodic action of a few fibres, not a tumultous action of them all. If there is this antagonistic action in the fibres of the heart, it is certainly, so far as I know, unique, and foreign to the action of all other collections of fibres. In fact, there appears an inherent improbability in the possibility of its existence even; and such an explanation can only be admitted in default of any other one, and when every other known cause has been looked for and found wanting. Such an association is not associated with scrutiny, but with the want of it. I believe we will find that we can no more have a spontaneous, uncalled-for, palpitation that we can have an uncalled-for, spontaneous hypertrophy, though not long ago that was supposed to be a common occurrence. As hypertrophy has been found to be a compensatory change, so will palpitation be found to be merely a symptom of over-taxation, and that only.

As palpitation occurs in structurally altered hearts on exertion, so it will be found, in nervous affections (so called) of the heart, to be the evidence of the heart's struggling against some opposition offered to the flow of blood. It is scarcely credible that palpitation can be connected with what is so obviously effort in the one case, and be simply an evidence of excess of power in another case. That palpitation may be occasioned by external agents, as nicotine or white hellebore, which French soldiers used to take to simulate heart disease, or any other agent which will disturb the nerve-balance, is as unquestionable as that it may also be relieved by other external agents. Thus, though palpitation may be allayed, and a partial palsy produced, by morphia or prussic acid, the remedies which are in most repute are diffusible stimulants, digitalis, and belladonna. Experiments on the frog have convinced me of what my clinical experience had long taught—namely, that digitalis and belladonna are really cardiac tonics—that is, they aid the ventricular contraction. They thus enable the heart to act more powerfully against the resistance offered, and in overcoming it the heart becomes quiet, regular, and normal; the quiet action or ability to act has taken the place of tumultous effort; the ventricle can now contract without the visible effort—palpitation. That the effect of these agents is not to paralyse the heart's efforts is evident from the increased strength which is obtained by their exhibition. The relief is not due to their palsying effort, but to their aiding contraction.

Palpitation may be due to a call on the right ventricle, where the excessive action (if it were so) of the ventricle would not cause any effect in the radial pulse, or systemic arteries. But to meet the question of palpitation by attributing it to an activity of the right ventricle only, in cases where effect on the arteries may be wanting, is simply to shirk the broad tissue. We know that the symptoms of overaction and demand on the right ventricle are widely different from those of simple palpitation; and that a totally opposite series of symptoms are then presented. We can scarcely, then, attribute palpitation to an over-action of the right ventricle only. That we may have a strong action of the right ventricle evoked when there is no stress upon the left ventricle is true; but in that *case again* it is effort to overcome obstruction. The fibres of the heart

are, in many instances, common to both ventricles, and excited action in one cannot exist without an approximating condition of the other ventricle.

In considering the question of nervous palpitation without corresponding effect upon the arteries, we must remember that the cardiac ganglia act against the inhibitory action of the vagus, as well as against the blood-column. It is possible, then, that there may be a disturbance of the balance between them. But then there would be a long irregular systole, as is seen when the balance is disturbed by poisons. In this condition the muscular fibres can take no part, except in acting in accordance with the nerve-force brought to bear on them. But in this disturbance of the nerve-balance the action is irregular, slow, and intermitting, according as some ganglia are more or less acted upon, and bears no resemblance to palpitation. Neither does galvanising the vagus, as done by Weber, act in a manner at all analogous to palpitation. There is arrest of contraction, with one or two powerful beats on cessation of the stimulus; but this is not palpitation.

In palpitation from dreaded loss of blood, as in uterine hemorrhage, we have what may truly be called over-action, by a reduction in the opposition offered to the ventricular contraction: the ventricular action is not excessive, but the blood no longer offers its wonted opposition. Now, muscular action must produce results either in overcoming opposition offered, or in unnatural contraction of itself—*i. e.*, spasm. When, then, in this condition, the muscular fibres are less distended by influx of blood, the energy is manifested in abnormal contraction, and ends finally in confirmed systole, as occurs in animals bled to death. The heart is here firmly contracted until it is impossible to contract further, but during this time the animal has died. Muscular action cannot go on without result; and if we have an action in the muscular fibres which is not met by some opposing force unnatural contraction, or spasm, must ensue; and if palpitation were truly over-action of the heart, it would be one of the most dangerous and fatal of conditions. The further the inquiry is pushed, the less evidence can we find in favor of palpitation being over-action of the heart; it is a laborious effort, either from increased demand on the heart, or unfitness in itself. The heart, when its integrity is impaired or it is exhausted by effort, palpitates—*i. e.*, a laborious evident effort takes the place of the steady normal contraction. If the obstruction offered is not at first sight apparent, it is nevertheless there. Muscular action cannot be barren in results: the ventricular action must either be apparent in the arteries, be neutralised by some condition existing in them, or end in self-contraction.

Palpitation as a temporary evidence of over-taxation, may be engrafted on chronic conditions of acknowledged failure of power. Thus in valvular disease, or dilatation, we may have irregularity, or even intermittency, as persistent evidences of cardiac asthenia, and along with this an enfeebled general condition: that a balance has been struck by the lowering of the general condition to meet the heart's enfeebled state. On this we may have implanted palpitation on exertion, as evidencing a temporary overthrow of that balance: no pathological condition is more common in fact. If, then, palpitation were truly over-action of the heart, the sufferer ought to feel more equal to exertion during its occurrence; it ought to restore again to him that power the want of which has so crippled him. In asthenic conditions palpitatation ought to be a tonic, and it ought also to occur most frequently among the robust and those accustomed to exertion;—*i. e.*, palpitation ought to occur when the heart has not its accustomed exertion to undergo, during general quietude. Whether such is the case, or palpitation is found to occur on or after exertion in asthenic conditions, I will leave to others to decide, as it is a question of fact. My own experience has been unequivocal. As not being normal action, it must be connected either with excess or deficiency of power. As to whether it is associated I leave to our common experience. If it be allowable to anticipate and to pry into the future, it may safely be predicted that in

time we shall come to learn that palpitation is as surely the evidence of over-taxation of the heart's powers, as we have learnt that cardiac hypertrophy is a compensatory growth, the result of a persistent call upon the heart for augmented effort. "It must be recollected that, in every organic disease of the heart, when palpitation becomes extremely violent and prolonged, both the impulse and the sounds may be diminished: in other words, the heart becomes gorged and incapable of adequately contracting on its contents, sometimes yielding a struggling convulsive impulse, with little sound and a feeble pulse, and, in an ulterior degree, especially during dissolution, scarcely producing either impulse, sound, or pulse. Suffocative dyspnœa, lividity, and extreme distress, are always concomitant symptoms." So wrote Hope even twenty years ago.—*Lancet, August* 6 *and* 13, 1870, *pp.* 179, 210.

24.—ON ANGINA PECTORIS.

By Dr. JOHN CHAPMAN, Physician to the Farringdon Dispensary.

Of all the various and agonizing forms which neuralgia assumes, this is at once the most terrific and the most fatal. It manifests itself differently in different cases, but in all, or nearly all, certain characteristic and exceedingly impressive features are observable. An apparently healthy man, probably over forty years of age, may be walking rather more briskly than usual, or may be going up stairs, when he is suddenly seized with a dreadful and indescribable pain usually referred to the heart as its chief seat, and accompanied by a sense of violent constriction of, or of pressure on, the chest. Generally while the paroxysm lasts the patient's anguish is horribly severe, and filled with terror, the sufferer feels as if in the very agony of death. Indeed many patients have the impression, as Sir Thomas Watson observes, "that to continue the exertion which has produced the attack —to stir another step—would be fatal." And yet as soon as the attack has subsided its victim is left much in the same condition as he was before he suffered it, and in many cases may quickly afterwards resume his walk or usual occupation as if nothing had happened. In many other cases, however, the paroxysms are so easily provoked, that the patient is compelled to be conscious of his every movement, and always assiduously on his guard. But in some cases no amount of care suffices to ward off attacks if the patient should venture on any muscular exertion. Trousseau mentions some striking instances of this kind. One gentleman induced oppression in the chest by the least active exercise, even by signing a number of official documents in quick succession; another, "if he happened to walk up the least ascent," says that eminent physician, "was instantly seized with pain, and was compelled to stop. He had just come from Lyons on the day when he consulted me. He had travelled all night, and as he came out of the railway carriage he had to walk a few steps about the station to get a cab. Although he walked quietly, he was seized so violently that he had a kind of fainting fit, and was obliged to sit down in the mud." Besides the feeling of impending death experienced during severe paroxysms, violent pains often extend over the base of the neck, the left mammary region, the left shoulder, down the left arm, beneath the shoulder blade, backwards to the spine, and sometimes, especially in very severe attacks, along the right extremity also. Indeed, in some cases the pain spreads still more extensively. In a case mentioned by Trousseau, "the pain started from the pre-cordial region, and radiated from it to the base of the chest, producing there a sensation of constriction which the patient compared to that which might be caused by an iron girdle tightened with force. It then spread to the loins, and ascending towards the cervical region, attacked the left arm, and extended into the very tips of the fingers." *As a rule,* however, the pain is mainly restricted to the left side. *In some cases the* region of pain in the arm is curiously limited, stopping

short at some special point, about the insertion of the deltoid muscle, for example, or at the elbow, or at the wrist. Occasionally the pain begins in the left upper extremity, and seemingly advances to the heart. In one of Trousseau's cases "the pain began at first in both shoulders, spread rapidly to the tongue, the neck, and then to the arms and chest;" in another "it began with an acute pain in the muscles of the left arm, and radiated from there towards the chest, a little above the heart." Sometimes prickling and numbness of the limb down to the tips of the fingers are also experienced. Vertigo, or fainting, is an occasional concomitant. In his general description of the malady, Sir Thomas Watson says: "The patient is on the very brink of fainting, nay, does at length faint irrecoverably;" but this expression is, I think, rather apt to mislead. We understand by fainting an arrest of cerebral action owing to a deficient supply of blood to the brain; and in the majority of cases of angina pectoris this does not occur. In many cases the intellect remains unimpaired and quite clear throughout the paroxysm. Moreover, in a certain proportion of cases the disease does not prove fatal, and therefore the words—"nay, does at length faint irrecoverably," depict it in even darker colours than experience justifies. It seems to me that in nearly all the cases in which the mental functions are disordered during an attack, the nature of the disturbance is much more nearly allied to that characteristic of the short fits of epilepsy than to that of syncope.

The aspect of the patient in the majority of cases is one denoting consciousness of extreme suffering and of extreme danger: he looks terror-stricken, and the spectator is filled with apprehension as to the result of the attack. No person who has once witnessed a severe paroxysm of angina pectoris is likely to forget the fear-inspiring appearance of the patient. The countenance generally becomes suddenly pallid, then gradually turns more or less red, and the features are almost invariably contracted and anxious-looking; the patient thinks he is about to be suffocated; different patients assume different attitudes, that which is least painful being no doubt instinctively chosen in each case. Along with the tingling or numbness, or both, of the upper extremity already mentioned, there is commonly a remarkable disturbance of the circulation visible in the hand and arm as well as in the face. The skin is apt to become excessively pale and cold, and almost immediately afterwards to change to a red, blue, or livid tint. When the attack subsides, a reaction of the local circulation, inducing turgescence, heat, and perspiration, is sometimes observable. Moreover, exceptional cases are recorded, in which one patient thinks his hands swell, another experiences a congestion of the mucous membrane of the nose, another is obliged to micturate, and another had an abundant secretion of intestinal gas during each attack. As a general rule the sense of suffocation which is experienced is not accompanied by any appreciable disorder of respiration. When breathing is interfered with, it usually is so only by the voluntary action of the patient, who fears to breathe lest he should increase his suffering. Paroxysms are prone to occur in the night, and even when the patient is asleep, and in some rare cases they exhibit a regular periodicity like those of ague. In the worst cases they increase in frequency and severity until at length they prove fatal.

The foregoing description fairly represents the chief features of angina pectoris; the phenomena differ, however, exceedingly in different cases, and the disease presents itself in all degrees of intensity. The truth of this remark will be well shown by the two following cases reported by Trousseau:—A gentleman, 60 years old, who had been suffering from diabetes about six years, was also afflicted with angina pectoris, which first attacked him shortly after the sugar was detected in his urine. The paroxysms recurred about one o'clock each morning, and began with an acute pain in the left arm, and then extended to the chest; it went on increasing progressively for an hour or two, then diminished slowly, and disappeared towards morning. . . . Although the pain was very acute, it did not prevent *him from drawing in a deep* breath at will, and he had never had

a sensation of suffocation. This slow process and decline of the attack, and the absence of the sense of suffocation, are remarkable in this case, while the next is scarcely less remarkable, because while it presented symptoms showing the affinity of the malady with ordinary angina, the patient, a young married lady, had no actual pain during the attacks. For the space of four years she had only excessively violent palpitations, without any sensation in the arm," and then during four subsequent years, "the palpitation was accompanied by painless numbness of the left arm, which compelled her to drop whatever she might be holding in her hand. These symptoms recurred whenever she took a little more active exercise than usual."

The age of a sufferer from angina pectoris is rarely less than forty. The disease is especially notable for attacking persons of middle and advanced life. The case of the young lady just mentioned may be fairly adduced as one of those exceptions which tend to prove the general accuracy of this remark; for though her malady exhibited indubitable affinities with angina pectoris, it was not characterised by any of those striking features which especially distinguish that disease, and which, in fact, originated its name.

Men are said to be much more liable than women to attacks of this disorder: of the eighty-eight sufferers, whose cases were collected by Sir John Forbes, only eighty were of the male sex. My experience leads me to doubt, however, whether men are attacked much more frequently than women, and Trousseau says,—"I do not think that it has been proved that males are more subject than females to this singular affection."

The exciting causes of attacks of angina pectoris are various, and differ in different persons; and when once the disease is really developed, the causes capable of inducing a paroxysm are astonishingly slight. Muscular exertion is one of the most frequent of these causes; the more violent it is, the more likely it is, of course, to produce an attack; but, in some cases, almost any muscular effort will induce it. Walking briskly very often does so, walking up hill or up stairs does so still oftener, and still more often an attack is brought on by walking or running against the wind. In fact, muscular effort of almost any kind will, in some cases, act as an exciting cause. In one case already mentioned walking in the most careful and quiet manner, and in another even the effort of signing a number of documents in quick succession induced a paroxysm. Mental emotion is especially notorious as an exciting cause. The celebrated John Hunter lost his life, as is well known, by an attack brought on by a fit of anger when he was at St. George's Hospital, where he expired. Indigestion or flatulency not unfrequently produces a paroxysm in some cases; and, indeed, it may be stated as a general rule, that any cause operating so as to produce disturbance of the nervous system is likely to bring on an attack.

The pathology of angina pectoris has given rise to many ingenious speculations and elaborate hypotheses; and, so far as I am aware, none of the latter are wholly satisfactory. Sir Thomas Watson is of opinion "that the seat of the disease is the heart, or the aorta, and that it consists in some structural change." He discredits the idea that the disorder is a neuralgic affection "because the paroxysm is excited by such causes as are especially calculated to disturb the natural action of the heart, bodily exertion, and mental emotion;" and because "the disease is so very frequently fatal." I confess, however, that these reasons do not seem to me cogent; attacks of undubitable neuralgia are not unfrequently excited by bodily exertion and mental emotion; and the objection that angina pectoris is so often fatal, whereas neuralgia is not, is at once disposed by the consideration that the fatality, or fatality of morbid actions, is mainly dependent on the nature of the function of the organ affected. For example, acute inflammation of the skin is rarely attended with any serious consequences; but inflammation of the mucous membrane of the trachea, in the shape of croup, is very frequently fatal; and, in like manner, a neuralgic, or spasmodic affection of superficial parts, may be unattended with danger, while *analogous affections* of the viscera, and especially of the heart and aorta,

may be remarkably deadly. The theory which seems to commend itself most especially to Sir Thomas Watson, is that which explains the disease "by supposing that the blood, whenever its movement is accelerated by exercise or otherwise, arrives at the heart faster than it can be transmitted onwards, and accumulating in its cavities, painfully distends them." This explanation is incapable of proof, while, on the other hand, certain mighty facts are decidedly opposed to it. A vast number of persons who are extremely prone to strong emotion, and, as a consequence, to sudden disturbances of the circulation and of the heart's action, are never attacked with angina pectoris; again, thousands of persons having notoriously weak hearts, which may be imagined to facilitate functional disturbance, do not have their hearts painfully distended so as to induce the disease in the manner supposed; while on the contrary, persons with robust hearts do sometimes die of angina pectoris; and in cases of chloroform inhalation, the right heart is abnormally distended, but I have never heard that those who inhale chloroform evince or experience effects like to those experienced by sufferers from angina pectoris.

Over distension of the heart's cavities is, by other pathologists assumed to be only a preliminary stage in the production of the disorder, such distensions being imagined to induce "the immediate cause of the paroxysm," viz., "a sudden impediment to the *coronary* circulation of the heart, and particularly to the return of the blood to the coronary veins." This theory seems to me untenable because, while like the preceeding one, it is incapable of proof—it is open to the fatal objection that *post-mortem* examinations reveal the existence of serious impediments to the coronary circulation in the shape of ossification of, or of atheromatous deposits in the coronary vessels of a great number of pe sons who never experienced angina pectoris. This objection is held to be a valid one by Dr. Stokes, who regards the disorder as "but the occurrence, in a defined manner, of some of the symptoms connected with a weakened heart." This opinion is directly convened by that of Latham, Walshes, and, among continental writers, Bamberger (quoted by Eulenberg), who consider the essential feature of angina pectoris to be a spasm of the heart, or aorta, or of both. The remarks which I have already made at the end of the chapter, on the pathology of neuralgia generally, will have already assured my readers that I look on the opinion of the authorities last quoted as substantially correct. Assuming it to be so, there still remains for consideration the important question,—by what agency is the spasm produced?

Arguing analogically, we are led inevitably to the conclusion that the muscular tissue of the heart and aorta assumes a spasmodic condition only when the nervous energy causing it to contract is morbidly excessive. We know that the heart itself is abundantly innervated—not only by the ganglia imbedded in its own substance, but from various extraneous and complex sources, both cerebro-spinal and sympathetic. The diversity of origin of this powerful nervous influence will probably always render it impossible for us to trace the special source and course in any given case of the morbid nervous force productive of angina pectoris, but it greatly increases the liability of the heart to dynamic disturbance, and affords a complete explanation how it is that the disease in question manifests itself in patients of extremely diverse constitutional conditions; and that its paroxysms are induced by a great variety of exciting causes. The tumultuous forces of violent mental emotions are flashed down the spinal cord, and spreading laterally through the ganglia of the sympathetic cause an instantaneous disturbance of the otherwise orderly nervous effluence to the heart from the cardiac plexuses; modifications, chiefly by way of acceleration, of the pulmonary circulation, caused by muscular exertion, produce apparently in the predisposed vaso-motor reflex actions on the heart and aorta, and consequently preternatural contraction of those organs; reflex actions of a like kind and producing like effects, may also proceed from the stomach and bowels, or even from the pelvic viscera when disordered; and *á fortiori*, when the heart itself is diseased, or when aneurism of any of the great

vessels in the thoracic cavity exists it is likely that in either the one case or the other the disorder will produce a reflex spasmodic influence directly on the heart or aorta, or on both together. It is therefore easily intelligible how it comes to pass that angina pectoris occurs with especial frequency in cases of ossification of the coronary arteries or of thoracic aneurism, although neither of those structural injuries is necessarily either an efficient or exciting cause of the malady. In short, the paroxysms of angina pectoris like those of epilepsy can only occur through the intervention of the nervous centres, and the exciting causes of the one disease as of the other can only operate through the agency of those centres. Moreover, I apprehend that just as there are cases of epilepsy which, having no assignable cause, are called idiopathic, so there are probably many cases of angina pectoris, the essential nature of which consists in an inherent constitutional predisposition to the malady existing aboriginally in the nervous system, and expressing itself whenever that system is especially irritated or excited by causes of any kind operative primarily in any part of the body.

I venture to believe that this view of the nature and genesis of angina pectoris will commend itself by virtue of its simplicity and vraisemblance to the majority of pathologists, and that on further examination it will be found to afford the only satisfactory explanation of the several morbid phenomena above mentioned as associated with the principal disease.—*Medical Mirror, Sept.* 1, 1870, *p.* 169.

DISEASES OF THE ORGANS OF RESPIRATION.

35.—A CLINICAL LECTURE ON PNEUMONIA.

By Dr. George Johnson, Physician to King's College Hospital.

We have recently had in the hospital a succession of cases of pneumonia. I purpose to give you now a condensed history of one typical case, and to make it the subject of some physiological and practical comments.

R. W., aged 53, cellarman to a wine merchant. Has drunk rather freely, but less so since he lost his wife six months ago.

On June 11, while at work, he felt giddy. This was followed by a sensation of cold, and he had a violent attack of shivering. He went home, and in the evening he had a sudden fit, during which, his daughter says, he was quite unconscious, and foamed at the mouth, but his limbs were not convulsed. (?) The foaming at the mouth continued for about a quarter of an hour, and he remained unconscious for about twelve hours. When he recovered his consciousness he was delirious, and continued so until his admission into the hospital on June 14th—that is, three days from the commencement of his illness. Here it may be well to mention that, for three days before his illness, he had been working in a cellar which was very cold and damp, in consequence of its walls being covered by fresh cement.

On the 15th it was noted that he was delirious, and talked incessantly during his sleep. The skin was hot; temperature 103°; pulse 104; respiration not noted. He had cough with rust-coloured expectoration. There was dullness on percussion; bronchial breathing and bronchophony over the lower lobe of the right lung. The urine was high-coloured, and contained one-fifth albumen.

On the 16th the temperature had risen to 104·2°; pulse 112. He was perspiring, and still delirious. Physical signs the same. The urine less albuminous—one-sixth.

On the 18th the temperature had fallen to 99·2°; pulse 80. Return crepitation over the right lower lobe. As he continued restless and delirious, he was ordered to take twenty grains of chloral-hydrate every four hours.

On the 20th it was noted that he had slept better; and was much less delirious; crepitation and a creaking friction sound over the right base; temperature 100·6°; pulse 92. To take the chloral three times a day.

On the 22nd slept well; continues to improve; no albumen in the urine.

On the 24th the chloral was omitted, and he was ordered to take a quinine and acid mixture. The signs of lung consolidation were passing away, but the friction sound was still audible.

On the 27th the friction sound had ceased, the temperature was normal, and he was convalescent.

It may be well to mention that until the chloral was prescribed he took no medicine. On his admission he had two ounces of brandy in the twenty-four hours; this was increased to six ounces on the 17th, and again reduced to four ounces on the 22nd. His diet was milk, beef tea, and eggs.

Now, let us consider briefly the physiological rationale of the symptoms in this case.

I look upon it that before there was any local mischief in the lung, there was blood-poisoning. The precise nature of the blood-poisoning is doubtful, but it may probably have been due to suppressed action of the skin, consequent on the chilling effect of working in a damp cellar. The evidence of blood-poisoning consists in the occurrence of rigors, followed by an epileptic seizure, and this again by delirium. Rigors are probably a result of interrupted circulation through the spinal cord, and the immediate cause of epilepsy is a similar interrupted circulation through the brain. To some extent, perhaps, the delirium was a result of his somewhat intemperate habits—it may have been a form of delirium tremens. Another fact which points to blood-poisoning is the occurrence of temporary albuminuria. Again, the high temperature was probably associated with a morbid process in the blood.

One of the most important results of this blood contamination was the exudation into the lung, the pleuro-pneumonia. Then there quickly followed a fall of temperature.

I have frequently pointed out to you a similar sequence of events in cases of pneumonia, and I have shown you that the exudation into the lung is speedily followed by subsidence of the febrile excitement. The exudation into the lung may be looked upon as analogous to the eruption on the skin in a case of small-pox. In both diseases, *i.e.* pneumonia and small-pox, a noxious product is thrown out of the circulation, in one case into the lung, in the other into the skin. In both diseases the appearance of the local symptoms is quickly followed by a fall of temperature and a diminution of the general febrile excitement. The structural changes in the lung and in the skin respectively, give rise to a fresh class of symptoms, and may in various ways cause distress and endanger life.

Now I have a practical object in directing your attention to what I venture to call the physiology of pneumonia which is not of traumatic origin. A right appreciation of the disease may enable you to prevent or to greatly mitigate the pulmonary symptoms. If we can catch the disease in the stage of the initiatory fever before the exudation process has commenced, I believe it is possible to prevent the pulmonary mischief by favouring exudation through other channels. In a large proportion of cases the exciting cause of pneumonia is suppressed action of the skin by a chill or other unknown atmospheric influence, and the main object of treatment should be as early as possible to restore the free action of the skin. This may be done in various ways—by a warm-water or hot-air bath, by packing in a wet sheet and blankets, and by the diaphoretic action of repeated small doses of antimony or ipecacuanha, with or without opium. This diaphoretic treatment is often successful in arresting a catarrh, and it may be equally successful in preventing or mitigating pneumonic exudation.

You will observe that vomiting and diarrhœa are amongst the symptoms which occur not unfrequently at the commencement of a febrile attack, which results soon in inflammatory consolidation of the lung. We may

take a hint from these phenomena, and assist in diverting mischief from the lung by an emetic or by a purgative dose of calomel and colocynth, followed by a saline.

The success of this abortive treatment of pneumonia depends mainly upon its early application. It is too late to attempt prevention when the lung tissue is already consolidated by inflammatory exudation. But inasmuch as before the occurrence of the pulmonary symptoms the precise nature of the disease must be uncertain, the beneficial results of the treatment will remain doubtful in proportion to the completeness of its success. When the lung tissue has become consolidated by exudation there is no need for active treatment. Expectoration and absorption will in most cases more or less rapidly restore the lung to its normal condition. Pleuritic pain, when present, may be relieved by warm fomentations or poultices, or if severe by the application of three or four leeches. With reference to the pain of pleuro-pneumonia, let me give you one practical hint. The pain may be sharp at the onset of the disease, it may subside entirely when the lung is consolidated, and it may return with some severity when the physical signs indicate that the lung consolidation is passing away. The explanation I believe to be this:—The pleurisy which complicates pneumonia is almost always dry pleurisy; there is lymph on the pleura covering the inflamed lung, but there is little or no serous effusion. The friction of the inflamed and roughened pleural surfaces increases the pain, the consolidation of the lung lessens lung and chest movement, thus friction and pain cease, to return when, with the passing away of the pulmonary consolidation, the lung and chest movements again become free.

You will often observe that with a return of the pleuritic pain there is a return of the friction sound, which may have been audible during the early stage of pulmonary engorgement, but not during the stage of hepatisation. In the case which I have just now read to you the friction sound was heard for the first time when the redux crepitation indicated that the lung consolidation was diminishing. Do not fall into the error of supposing that the redux pain and friction sound indicate a fresh attack of pleuritic inflammation. Lastly, let me say that the case to which I have referred is one of many in which the hydrate of chloral has had a most beneficial influence in allaying delirious excitement and procuring sleep, without in any way impeding expectoration or the healing process in the lung.—*Medical Times and Gazette, Aug.* 6, 1870, *p.* 145.

36.—ON INFLUENZA.

By Dr. C. Handfield Jones, F. R. S., Physician to St. Mary's Hospital.

Too many are inclined, I fancy, to look upon influenza as essentially a bronchial catarrh; but I quite agree with Graves and Blakiston that its cause acts in a special manner on the nervous system, and that it is no mere inflammation. The peculiar prostration, the headache and other nervous symptoms, which are not unfrequent, differentiate it markedly; besides the suddenness of invasion, which is often very remarkable. I will narrate a case briefly to you which illustrates these points well. T. P., aged 32. had been in hospital three weeks under my care for epididymitis, and was nearly well, when he was taken one morning, about 10.30, with severe headache prostration and fever. His pulse was very weak, 135, and his temperature 106·5, the same afternoon. There was some deficiency of breathing at the right posterior base, but no marked dulness or crepitation. The lungs continued free; the temperature and pulse soon declined to a lower, though still febrile rate; but his brain remained seriously enfeebled for more than a fortnight after his seizure, and he convalesced very slowly. Giddiness and prostration of mental activity were the most remarkable phenomena. Ten days after his seizure, he staggered and fell *down when* he got out of bed; and, a week later, he was so torpid and

silent that I had some difficulty in getting him to answer questions. His pulse and temperature had, however, become natural, except that the former was very feeble. Here it was manifest that the stress of the disease fell altogether on the encephalon, and that the lungs were very slightly affected. In our first case, it was much the same, though there seems to have been a greater amount of catarrh.

Another instance worth mentioning is that of a middle-aged lady who had very great prostration of brain-power, so that she could scarcely attend to her household matters. Strychnia did her great good. Her husband at the same time had severe catarrh, coughed violently in the early morning, and sweated so copiously at night that he had to change his night-shirt.

It is hardly an hypothesis to say, that in the first of these cases, the hemispheres, and in the second the vaso-motor nerves, were also solely affected. The lady remarked to me, that she supposed she had "suppressed catarrh."

The peculiar jarring sensation throughout his body which our patient experienced can only be regarded, I believe, as a modification of cerebral derangement, dependent, perhaps, on special implication of the sensory nerve nuclei. That, under certain circumstances, the normally insensitive hemispheres may become the seat of pain, I can hardly doubt. A managed 70, consulted me once, complaining of a "soreness of the brain;" any motion or coughing jarred and hurt his head, or rather its contents. His head, however, was not tender to tapping. He had no rheumatism; no syphilis; no paralysis. His intellect was clear; but he had sensations of things crawling about the low part of his forehead. The age of this patient would make one suspect calcification of the cerebral arteries; and this might occasion the symptoms complained of. However this may be, there can be little question that, owing to some defect in nutrition, the cerebral nerve-tissue became intolerant of slight commotions which ordinarily it could have endured very well.

But to return to our patient: I do not think the peculiar dysæsthesia of which he complained—the jarring sensation—was of any special significance. No doubt some minute modification of molecular arrangement corresponds to each of the manifold dysæsthesiæ which such sufferers experience; but these are far beyond our ken, and it is not of any vital importance to the practitioner to be acquainted with them. The subjective phenomena (the same is true of the objective) are no sure guide to the *quality* of the disorder; and this is what especially concerns us. You will never treat derangements of the nervous system successfully, if you suppose that all phenomena having the same outward appearance are really alike. Cases of delirium, of spasm, of neuralgia, differ very greatly, though, as far as phenomena go, they are identical. In the case of H. G., I was led into error at first by the history and by the evident signs of prostration of nerve-power. These led me to give tonics and stimulants, which availed nothing for the relief of his head. When, however, I administered an unexciting calmative, aided by a counterirritant (for such I consider the sternutatory), improvement ensued rapidly. You may, perhaps, think that such a remedy ought, on rational grounds, to have been employed at once; and that stimulants were inappropriate to the symptom *pain*. A little experience, however, will show you that, in a multitude of instances in which debility constitutes a prominent feature, stimulants are most efficacious sedatives. Two or three glasses of port wine will remove, for the time, neuralgia in some cases. All neuralgic pain, however, is not to be thus dealt with; and you may need, to allay it, remedies which are very much the reverse of stimulants, such as hydrocyanic acid, bromide of potassium, aconite, and moist warmth. When I find such means as these successful, I think the condition is thereby at once differentiated from that in which our ordinary tonics avail; just as much as two different saline solutions are distinguished by chemical tests.

As I have above said, I cannot tell you in what the essential difference

consists; but I find it of value to keep in my own mind the two conditions separate, and to denote them by some such terms as neuralgia and hyperæsthesia. It may aid us in forming more definite conceptions of these two states, if we call to mind their analogues among motor disorders, such as choreal paralysis and jactitation, which, though extremely unlike, undoubtedly originate in the same morbid process, and are, so to speak, truly homogeneous. It is a fact, that all causes which impair strength are very prone to generate hyperexcitability, which may show itself in the sensory, or motor, or intellectual departments.

Lastly, as to the sternutatory. This must be regarded as a form of counterirritation; having this advantage, however, that it is capable of repeated application within a short time; and that it provokes repeated diversions of blood, with mucous exudation. The formula which I employed is that recommended by Dr. Laycock; and you see that it was very positively more efficacious than common snuff. Its good effect on our patient depended, I think, on its producing reflex stimulation of the vaso-motor nerves of the cerebral arteries, and lessening the blood-flow, which was probably excessive for the *weakened* tissue. I emphasize the word weakened; for I hold it well ascertained, that an organ whose vitality is vigorous can bear and employ beneficially a much larger supply of blood than one which is in an opposite state. The nerves of the Schneiderian membrane are perhaps better fitted than any to exert this constringing influence. At the same time that the sensory nerves of this membrane are excited, its vaso-motor are, in all probability, relaxed; so that the vessels become suddenly congested, and modified blood-fluid and corpuscles escape. This seems to be the general rule in all localities, that tissue-excitement determines vasal relaxation. Fatal cases of tetanus and chorea afford marked examples; the vessels of the cord or other nervous centres being engorged, and rupture and extravasation having ensued in some places. To an hyperexcitable organ, an undue amount of blood-flow is certainly injurious; so that it is good practice to try to calm tissue-excitement while we constringe vessels.

I do not know that I can altogether explain the mode of action of counterirritants; but their utility, in spite of recent skepticism, I do not doubt; and I strongly advise you not to doubt.

To conclude, let me counsel you to familiarise your minds with such common things as the management of headache in its various forms. Many of you may never perform lithotomy, nor perhaps amputate; yet students crowd to gaze at the great operations, of which they can see next to nothing, and which they are little likely ever to perform; while they can hardly be brought to give a thought to the treatment of a malady which they may have to deal with any day of their lives.—*Brit. Med. Journal, July* 23, 1870, *p.* 81.

37.—SUBCUTANEOUS PNEUMATIC ASPIRATOR.

Under this title Messrs. Weiss and Son have introduced to the profession a new instrument, invented and patented by Dr. Georges Dieulafoy, of Paris, which promises to be of great practical value.

It consists of a glass exhausting syringe, capable of being attached to a fine tubular exploring needle, or to a canula of larger size. The syringe being first exhausted, and its piston secured by a half-turn, which engages the notch in a catch, an exploring needle is introduced at any point beneath which the presence of liquid is suspected, and is carried to a sufficient depth to prevent air from entering at its point. The exhausted syringe is then connected with the needle, either directly or by the intermediation of an elastic tube; and a stopcock between the channel of the needle and the vacuum is opened. The needle is then carried onwards, *and as soon as* its point reaches fluid this fluid rushes into the vacuum.

By closing the stopcock and opening a lateral one, the fluid can be driven out into a vessel by disengaging and pushing down the piston; and by drawing up the piston when both cocks are closed the vacuum is restored, and will be again filled by fluid as soon as the communication is reopened, and as long as there is any left to flow. In this way, according to the inventor, fluid may be discovered at any depth, and removed without risk from any situation. He has operated upon joints, the pleura, deep abscesses and even the head in cases of hydrocephalus, and in many cases with great advantage.—*Lancet, May* 28, 1870, *p.* 773.

DISEASES OF THE ORGANS OF DIGESTION.

38.—ON THE USE OF ARSENIC IN CERTAIN PAINFUL AFFECTIONS OF THE STOMACH AND BOWELS.

By Dr. ARTHUR LEARED, Senior Physician to the Great Northern Hospital.

Pain after food is a very common symptom of dyspepsia, and in many cases seems to constitute the disease. This pain usually yields to medical treatment and proper diet. But there is another kind of gastric pain far more severe than that which depends on food, and which does not yield to ordinary remedies. I have elsewhere pointed out how this pain may be removed, and the subject seems of sufficient importance for some further remarks. [Vide *British Medical Journal*, Nov. 23 and 30, 1867, and "*Retrospect*," vol. lvii., p. 92.]

In case of the stomach, the pain we have to deal with happens to the same individual at one time when it is full, at another time when it is empty. But cases are met with in which the presence of food in the stomach is clearly the exciting cause. The typical case is that in which there is pain independent of the act of digestion. In this form it commonly seizes the patient in the middle of the night, and is not preceded or attended by any dyspeptic symptoms. The pain in these instances, which are fortunately not very common, is extremely severe and attended with alarming prostration, lowering of the heart's action, pallor, and cold perspiration. Brandy and other stimulants give but little relief, and after a period of agony, sometimes extending to several hours, the attack ceases as suddenly as it had commenced.

Persons of middle age who have been exposed to some great cause of mental depression are peculiarly the subjects of this affection of the empty stomach. Dr. Budd has also noticed mental disturbance as an exciting cause of the disorder, and he adds that "it is closely allied to water-brash." In this statement I do not concur, for without entering into the vexed question of the nature of water-brash, it is sufficient to say that a particular remedy which cures the one proves injurious to the other.

Further experience has taught me that the bowels, and especially the small intestines, are subject to the same kind of pain. I do not include colic from the effects of lead; but many cases of so-called colic unaccountably occurring at longer or shorter intervals are from the same cause. For whether the pain attacks the stomach or the intestines, its nature is the same; it is essentially neuralgic. Upon this circumstance the success of the new treatment, which consists in the judicious exhibition of arsenic depends. As may be inferred from what has been stated, the difficulty of diagnosis between the neuralgic and the more common forms of gastro-intestinal pain is sometimes very great. The best rule of practice is, when gastric or intestinal pain resists all ordinary treatment, and cannot be traced to gall-stones or any organic source, to test the matter by the effect or non-effect upon it of the remedy. By this method I have succeeded in effecting several cures. On the other hand, the arsenical treatment has

failed in two cases in which, so far as the diagnosis could be established, it ought to have succeeded. In both instances the patients were women past middle age, of stout habit, and too freely addicted to the use of alcoholic stimulants.

The curative effects of arsenic are most striking in severe cases of paroxysmal pain, and its success becomes doubtful in proportion as the case assimilates to those in which a lower degree of pain is traceable to the influence of food. In determining the question of the fitness of a case for the arsenical treatment, certain circumstances may render essential aid. If the disease came on after some mental shock or severe trial, if the patient has previously unmistakeably suffered from neuralgia, if he has lived in a marshy district, and especially if he has had hemicrania or ague, and if in addition to the occurrence of one or more of these circumstances the pain is paroxysmal, it will almost certainly yield to arsenic. But as already said there are other cases suitable for the treatment, and they are the most numerous, in which the pain closely resembles that which attends dyspepsia. It is sometimes extremely difficult to make the diagnosis between neuralgic pain of the stomach or bowels and the pain caused by gall-stones. But in my previous paper I have gone into detail respecting this and other sources of error.

A few words will suffice as to the particular preparation of arsenic to be selected, and the extent to which it should be used. In most cases the liquor arsenicalis answers every purpose, but when the system is more than usually susceptible of the action of the mineral, the liquor sodæ arseniatis seems to irritate less, and in a few instances the acid solution of arsenic is to be preferred to either. Whatever preparation be selected it should always be taken immediately after food, and, notwithstanding that its beneficial action may have been previously observed it will be proper to continue the medicine until its constitutional effects are well marked. Notwithstanding what has been said to the contrary, I do not believe that the proper use of arsenic as a medicine is followed by any injury to the system.

The following brief notes illustrate the utility of the treatment in cases in which the pain is increased by food, and also its effect in cases in which the intestines are affected:—A lady, 40 years of age, who had met with a reverse of fortune by the death of her husband two years previously, was sent to me by her medical attendant in January, 1869. I was informed by him that every ordinary means, including a milk and farinaceous diet, with entire abstinence from meat for eight months, had been exhausted in his attempts to relieve her sufferings. These consisted in constant pain in the gastric region, extending round the left side to the centre of the back. The pain was much aggravated by meals, especially by breakfast and tea, and at times it amounted to perfect agony. Vomiting frequently ensued, and then some relief of the pain was obtained. There was great flatulence, a sense of oppression in the stomach, and obstinate constipation. The patient, naturally of stout habit, had lost over 50 lbs. in weight. She was immediately put on the arsenical treatment, which was speedily followed by great improvement. The treatment was continued, and the dose gradually increased until the constitutional symptoms, which consisted in this instance of itching of the eyes, soreness of the soles of feet with a red rash upon their sides, ensued. By this time her cure may be said to have been complete; she rapidly gained flesh and strength, and has since remained well.

The symptoms in this case resembled those of ulcer of the stomach, but the fact that a rigid milk and farinaceous diet increased rather than diminished them was opposed to this view.

A gentleman, 28 years of age, much engaged in commercial speculations, consulted me in the early part of the present year. He had been for a long period subject to a violent but dull pain in the umbilical region, coming on about two hours after meals. For the three previous weeks it *had happened* daily after breakfast, luncheon, and dinner. Liquids, even

plain water, induced it more than solids. There was neither flatulence nor any other stomach disturbance, and the bowels were quite regular. Various plans of treatment had been found ineffectual. He had suffered from neuralgia in the left temple two years previously. Notable relief was afforded by the liquor arsenicalis after it had been taken only two days; it was continued altogether for about three weeks, when his eyes became affected. At this time the disease had quite subsided.—*Medical Times and Gazette, July* 23, 1870, *p.* 94.

39.—ILEUS TREATED BY ELECTRICITY.

By the CHEVALIER DR. MACARIO, Nice.

[The patient was a man of 71, the subject of obstinate constipation. He was in the habit of using large and repeated enemas. On the morning of the 26th of February he actually had six enemas, the two last of which only were retained. After this he was seized with violent pains, vomiting, and suppression of both urinary and alvine evacuations.]

When I arrived the first symptoms had appeared twenty-eight hours, the patient was plunged into a species of drowsiness from which he was roused every fifteen minutes by abdominal pains, followed by vomiting. There was no fever, but the pulse was very small, the abdomen tympanitic, and the intestinal circumvolution delineated on the abdominal walls. There were hiccough and stercoracious vomiting in my presence. I explored the abdomen carefully, but found no hernia. In the presence of so serious a case, I suggested a trial of electricity. Consequently I procured the apparatus of Gaeffe for the induction of volta-faradic currents, and proceeded immediately to the operation. I introduced into the rectum a metallic conductor, which I then connected with the positive pole, then the negative pole, alternately moving the other furnished with wet sponge over the abdomen in the region of the transverse colon particularly, where was the seat of pain. I used at first the full strength of the electric current. Under its influence the abdominal walls contracted with violence, rising like an agitated sea. The patient complained very much. The operation was continued ten minutes; immediately after it, the pain in form of a bar vanished away, the vomiting ceased, the general state mended, and the patient felt much better. I suspended the electricity, and waited for the evacuations. The calm kept up, and the vomiting did not appear any more; in the evening, four hours after the operation, a first copious evacuation appeared spontaneously, which was followed by several others in the course of the night, and the day following the patient was cured entirely. He was delighted at having escaped a great danger. I do not know if electricity has been employed in like cases, but I am persuaded that this case will interest the profession.—*Medical Press and Circular, June* 15, 1870, *p.* 469.

40.—ON THE USE OF RAW MEAT IN DIARRHŒA AND DYSPEPSIA.

By Dr. ROBERT DRUITT, London.

I learned the use of raw meat as a remedy for diarrhœa, from the late estimable Professor Trousseau, during a visit paid to his clinique at the Hopital des Enfans Malades in 1851. Since that time I have had abundant opportunities of proving its efficacy, and although I know that it is largely used by some physicians, it may not be unseasonable at the present time to call attention to it, and to encourage its more general use.

Let me begin with a few words on the mode of preparing it. The meat

used may be either mutton or beef—say a tit-bit of the loin of mutton, or of the fillet or other tender part of beef. This must be submitted to a process either of pounding, or of scraping, so as to get out the red soft muscular substance, as free as possible from all fat and fibre. The muscular substance so prepared forms a soft pink pulp, and even a good-sized piece of raw meat seems to yield wonderfully little by comparison with the parts that are rejected. It must be a pulp, giving no feeling of resistance when squeezed between the fingers.

The modes of administration are many. It may be given by itself, and this way is best in the case of young children. Very young infants may suck it from the end of their nurse's finger, and most of them take it greedily enough in this way. Children who are older, say from two to five, may swallow it if dusted over with white sugar. Older persons may take it conveniently if diffused through a little strong beef-tea. But there is another way for which I am indebted to a lady who has made very large use of this remedy in the case of her invalid daughters, and which is known amongst a pretty wide circle as a *jellied chop*. This consists in diffusing the meat pulp through a stiff meat jelly, and allowing it to cool in a shape. This is eaten like a spice, and is very nice to any one whose prejudices are not aroused by the notion of rawness. Salt and other condiments may be added at discretion.

The cases in which raw meat has peculiar efficacy, are those in which other food passes undigested, and adds to the irritation of bowels in a state of diarrhœa. It seems to furnish the most efficient kind of nutriment with least inconvenience from bulk or other quality, and to be digested and absorbed with as little fæcal residuum as possible. Still there must be something more about it than this; for the liquid essence of beef will not take its place, neither will cooked meat.

First amongst the cases in which it is useful may be mentioned any acute cases of infantile diarrhœa, especially the infantile "cholera" of summer. No matter what medicines and what other kind of food may be used. I believe raw meat to be in itself both a remedy for the diarrhœa and a nutriment that may keep the child alive till the disease passes off.

Secondly, in the chronic diarhœas of children, arising from scanty food, or what comes to the same thing, food which cannot be digested, and which consequently passes the bowels as a foreign offending substance, here the raw meat acts as food and medicine.

In the habitual diarrhœa associated with "marasmus"—that is, with the superficial ulceration of the intestinal mucous membrane, and the enlarged mesentoric glands of strumous children—the raw meat, especially in the form of the "jellied chop," is of most especial service. It is curious to see in cases of this sort how absolutely the stomach sometimes refuses to act upon the food put into it, so that meat, milk, &c., may be recognised unaltered in the fæces. It is just in these cases that the raw meat shows itself susceptible of quick digestion in the stomach. The cases which the ancients called *lienteria* or *intestinorum lævitas*, and which were designated in England in the last century "lubricity of the intestines," in which stomach and bowels are so irritable that they pass on and eject the food before it has had time to be dissolved and absorbed—are equally benefited by the use of raw meat.

Lastly, there are the cases of the obstinate vomiting of pregnancy, whether attended with diarrhœa or not. This is a kind of case in which no remedy is unwelcome or superfluous. I cannot take to myself the credit of suggesting it, for the mother of a young pregnant lady who was in imminent danger of exhaustion from vomiting, had witnessed the good effects of this food in the case of another daughter who died of ulceration of the intestines, and gave it of her own accord. But I can bear testimony to the fact that the raw meat was taken readily and kept down when almost every other food was loathed and vomited, and I consider the patient's safety was largely due to it.

There are other cases of atropy, dyspepsia, and malnutrition in which I

have found it useful. I should like also to say a few words on some other uses of meat, cooked as well as raw; but at present I wish mainly to call the attention of my medical brethren to its efficacy in diarrhœa, which may be expected to be the cause of an abundant mortality of infants during the next two months.—*Med. Times and Gazette, July* 2, 1870, *p.* 4.

41.—THE LIVER THE SEAT OF FORMATION OF UREA.

The latest researches upon the place of origin of urea, and especially the beautiful experiments of M. Gréhant, have demonstrated that the kidneys are by no means secretory, but purely excretory, organs for urea. Dr. Cyon, in the last number of the *Centralblatt* publishes a few facts in the form of a provisional communication, to show that it is probably produced at the liver. The plan of experimentation adopted (in common with M. Istomin) was as follows: The whole of the blood was abstracted from the carotid of a dog, and a portion, after being defibrinated, was transmitted by means of mercurial pressure through the liver. Coincidently three canulæ were introduced—one into the inferior vena cava, the second into the hepatic artery, and the third into the vena porta. The results of careful analysis showed that the blood which had passed through the liver contained a much larger proportion of urea than ordinary arterial blood. In one experiment 100 c. c. of the arterial blood when defibrinated contained 0·08 grammes of urea; but after having been passed four times through the liver, the same quantity contained 0·176 grammes.—*Lancet, Oct.* 1. 1870, *p.* 478.

DISEASES OF THE URINARY ORGANS.

42.—ON THE TREATMENT OF ACUTE AND CHRONIC BRIGHT'S DISEASE.

By Dr. GEORGE JOHNSON, Physician to King's College Hospital; Professor of Medicine in King's College.

[The term Bright's disease is nearly but not quite synonymous with renal albuminuria. The principles which should regulate our treatment of the disease are pretty well known, but anything from so good an authority on the subject as Dr. Johnson cannot but be worth study.]

The causes of renal albuminuria arrange themselves in two main divisions.

1. A mechanical impediment to the escape of the venous blood from the kidney, as from disease of the heart or lungs; the pressure of dropsical fluid in the abdomen; sometimes probably, the pressure of the gravid uterus.

2. An abnormal condition of the blood is by far the most frequent cause of albuminuria. This albuminuria occurs not infrequently as a result of scarlatina, diptheria, erysipelas, typhus and enteric fever, pyæmia, cholera, measels, purpura, gout, etc. The albuminuria which sometimes occurs during the early stage of pregnancy is probably a consequence of blood-changes associated with that condition; while that which occasionally follows parturition is, in all likelihood, a result of absorption of septic materials from the uterus.

Thus albuminuria may result from a primary mechanical hindrance to the movement of blood, or from a primary change in the quality of the blood. On the present occasion I shall exclude from consideration that class of cases in which albuminuria is the result of a mechanical impediment to the circulation and consequent passive congestion of the kidney. My remarks will have reference only to the more numerous second class of cases—cases of albuminuria the results of abnormal states of blood. I shall

endeavor to make my remarks as practical as possible, with only so much of reference to pathological theory as may serve to guide or to explain practice.

The extreme frequency of renal disease is a physiological result of the kidney forming one of the main channels by which effete and noxious materials are cast out of the circulation. During the process of excretion, the kidney-tissues—primarily the gland-cells, secondarily the blood-vessels—undergo structural change. A leading principle of treatment is to lessen as much as possible the excretory work of the kidney, more especially in cases of acute Bright's Disease. The main points are—rest in bed in a room of moderate uniform temperature; a carefully regulated and a somewat scanty diet; the adoption of means to promote a free action of the skin and bowels,

In all cases of acute Bright's disease, rest in bed is an essential part of the treatment. In a large proportion of cases, this with a scanty diet will suffice for the cure. The diet may consist of milk alone if it suits the patient's stomach, or milk with an egg or two in the course of the day, or with the addition of beef-tea or other animal broth. Under this regimen the urine soon becomes copious, while the albumen diminishes and gradually disappears.

The copious flow of urine which usually occurs during convalescence from acute Bright's disease is thus explained. During the acute and congestive stage of the renal disease, the constituents of the urine—both solids and liquids—have accumulated in the blood, and have thence been effused into the areolar tissue and into the serous cavities. Now, urea is a most powerful diuretic. When injected into the veins of a dog, it quickly excites a copious flow of urine; and no sooner is the inflammatory congestion of the kidney removed, and thus the freedom of the renal circulation restored, than the urea retained in the blood begins to exert its natural diuretic action upon the kidney. The copious flow of urine thus induced speedily removes the accumulated urinary solids and water from the blood, the areolar tissue, and the serous cavities, into which they have been effused, and thus the dropsy is cured,

This abundant flow of urine occurs without aid from diuretics or drugs of any kind. I have seen it occur while a bread-pill or colored water was given as a placebo. Stimulating diuretics such as squills, or cantharides, or turpentine, would be injurious, by increasing congestion of the kidney. The best diuretics in such cases are those means which tend to lessen renal congestion—dry cupping or hot fomentations over the loins, hot-air or water baths, purgatives, and a scanty diet, with a free use of diluent drinks—one of the best and pleasantest drinks being the "imperial drink," made with cream-of-tartar and lemon.

When the renal congestion is extreme, as shown by the scanty secretion of highly albuminous urine, local bleeding by leeches or cupping on the loins is often extremely useful. If by the abstraction of a few ounces of blood from the loins we relieve the renal congestion, we shall check the rapid destruction of blood constituents which results from uræmia; moderate local bleeding, therefore, tends to economise blood, and to prevent its waste.

It has been asserted that cupping or leeching the loins can help an inflamed kidney no more "than if the blood had been taken from the arm or from the nape of the neck." But this, surely, is a mistake. The lumbar arteries, which supply the integuments of the loins, arise from the abdominal aorta, close by the origin of the renal arteries; and when leeches or cupping-glasses draw blood through the skin of the back, it is certain that the diminished pressure within the lumbar arteries will divert a certain quantity of blood from the neighbouring renal arteries. The same principle explains the good effects of leeching in cases of pericarditis. The internal mammary artery sends deep branches to the pericardium, and superficial branches to the intercostal spaces and the skin. By the application of leeches over the heart, we abstract blood from the integumentary

branches of the internal mammary artery, and thus divert a portion of blood from the deeper pericardial branches. The blood will as surely take the course indicated by diminished pressure within the vessels as the water in a pump will, up to a certain height, follow the rising piston. It may be thought that the quantity of blood thus diverted is very small: so, in the case of venesection being practised in the arm or neck, how scanty is the stream of blood which escapes from the opening in the vein compared with the torrents of blood rushing through the venæ cavæ into the right side of the heart; and yet in a case of obstructed circulation through the heart or lungs, how promptly and decidedly does this small diverted current lessen the distension of the whole venous system. Hot fomentations or poultices on the loins act by relaxing the superficial arteries. The skin, therefore, receives a larger supply of blood, and thus a portion of blood is diverted from the renal arteries. Then, too, there is some degree of depletion from the full cutaneous capillaries by the free local sweating which the warmth occasions.

Dry cupping acts in a somewhat similar way to hot fomentations. It draws an abundance of blood through the arteries into the subcutaneous capillaries, which, when the cups are removed, returns through the veins to the heart. In order that dry cupping may be most effectual, each cup should be removed as soon as the vessels beneath are well filled, and then it should be reapplied. The object is first to draw the blood through the arteries into the capillaries; then to allow it quickly to return by the veins, and not to keep it stagnating in the capillaries, which will happen if the glass be retained long on one spot. Another point is not to draw the blood into the skin with sufficient force to cause extravasation, the effect of which will be to impede the circulation through the skin, and so to divert more blood into the inflamed tissues beneath. The sole object of dry cupping, be it remembered, is not to irritate the skin, but to draw blood rapidly from the arteries, and as rapidly to transmit it through the capillaries to the veins, in its backward course to the heart.

As a rule, it is well to give no alcoholic stimulants; or, if need be, to give them very sparingly in cases of acute Bright's disease. The imbibition of alcohol imposes extra work upon the kidney, and so is opposed to the principle of lessening as much as possible the work of the inflamed gland. Excess of alcohol is a not infrequent cause of albuminuria; and a very moderate employment of alcohol may tend to perpetuate and aggravate disease.

Not long since, a man was admitted into King's College Hospital completely narcotised by a surfeit of wine, which was pumped from his stomach in large quantities. The urine drawn off from the bladder contained a large amount of albumen. In a few hours the man recovered consciousness, and the urine became normal. The temporary albuminuria was a result of renal congestion while the excess of alcohol was being excreted by the kidneys.

When acute Bright's disease is making satisfactory progress towards recovery, the dropsy usually disappears for a variable time before the urine ceases to be albuminous. It is very important to impress upon the patient that until the urine has regained its normal characters, he must be extremely careful to avoid cold, fatigue, and errors of diet.

The duration of albuminuria in cases that ultimately recover is very variable. I have seen many cases of recovery, after the disease had continued for from three to twelve months; and I have seen some recover after the urine had been albuminous for one, two, three, and in one case four, years.

The more I have seen of the disease, the more hopeful I have become as to the ultimate result, when the history and the symptoms, and above all, the chemical and microscopical characters of the urine do not indicate extensive and irremediable degeneration of the kidney. In all the cases of recovery from long-continued albuminuria, the preparations of iron have entered largely into the medicinal treatment of the disease, and have ap-

parently contributed much to the favourable result. There are two preparations which I believe to be especially useful: these are the tincture of the perchloride and the syrup of the phosphate. I believe that they are best taken with the food. I have frequently combined with each dose of the perchloride of iron ten grains of hydrochlorate of ammonia; and I believe that this ammonia-chloride of iron is a useful combination.

Amongst other remedial agencies, when acute renal disease is prolonged and threatens to become chronic, change of air and scene is often highly beneficial; and I have seen some most remarkable recoveries effected under the influence of a long sea voyage.

There are few diseases which, during their progress, cause more varied and severe suffering than confirmed chronic Bright's disease in its various forms. As the symptoms vary in the different forms of chronic renal disease, so a varied treatment is required in the different classes of cases. Without entering into minute pathological distinctions, for which we have now no time, I purpose to say a few words on the treatment of some of the more frequent and distressing symptoms.

In one class of cases—cases of large white kidney, with a scanty secretion of highly albuminous urine—dropsy is usually a prominent symptom. The tendency to dropsy is without doubt increased by the dry and inactive state of the skin; and this condition of skin seems to be mainly due to the hypertrophy of the muscular walls of the minute subcutaneous arteries. This excessive muscularity of the small arteries enables them to resist the relaxing effect of external warmth, so that a hot-air bath often fails to excite diaphoresis. Patients who do not perspire under the influence of a hot-air bath, usually complain of painful throbbing in the head, difficulty of breathing, and other distressing sensations. So frequently is this the case, that in cases of chronic renal disease I am now in the habit of substituting for the hot-air bath a prolonged packing in a wet sheet, surrounded by blankets. Patients often remain packed for periods varying from one to three or four hours, not only without distress but with comfort and decided relief.

Diuretics are notoriously uncertain in their action. I have often obtained good results from the imperial drink, in doses of from one to three pints in the twenty-four hours. A very efficient diuretic is a strong infusion of fresh broom-tops, taken in sufficient quantity to act as a purgative. The free action of a hydragogue purgative, elaterium, compound jalap-powder, or compound gamboge-pill, is very commonly followed by a copious flow of urine. The escape of water by the bowels lessens the distension of the systemic veins, the circulation becomes more free, and therefore the secretion of urine more copious.

When other means fail to remove anasarca, acupuncture of the legs, or an incision with a lancet, often affords prompt and decided, and sometimes permanent, relief. I have seen a considerable number of cases in which life has been prolonged, and some in which complete recovery resulted, from the operation, after other means had failed to afford relief. It is very interesting to note the phenomena which follow upon acupuncture or incision of the legs in cases of anasarca. There is, first, a copious drain of liquid through the skin; then there is a further exudation of liquid from the over-distended blood-vessels; this liquid also escapes through the punctures, and its escape is often associated with temporary symptoms of exhaustion, a rapid and feeble pulse, and pallor of the face. Lastly, there often occurs a more copious secretion of urine, in consequence of the greater freedom of the circulation through the kidneys.

Dropsical accumulation tends to cause a secondary impediment to the circulation by the pressure of the effused liquid from without upon the blood-vessels, especially the veins. Again, the capillary circulation becomes more and more impeded in proportion to the increasing watery distension of the veins. The drain of liquid from the areolar tissue through the punctured skin, allowing a further exudation from the distended capil*laries,* thus removes or lessens the obstruction which results from over

fulness of the veins. The general circulation, therefore, becomes more free, and the greater freedom of the circulation through the kidney is attended, as we have seen, by a more copious secretion of urine. But it may be objected that incisions and punctures in anasarcous legs are apt to excite destructive inflammation. It is true that inflammation and sloughing may follow the operation; but this may also occur from over-distension of the skin or the pressure of the heavy dropsical legs upon the bed. The result of my experience is, that inflammation of anasarcous legs has been as often subdued as provoked by acupuncture or incision; that inflammation is less likely to follow punctures in cases of renal than cardiac dropsy; and that the risk of inflammation after an incision about a third of an inch long in each leg, or after several acupunctures, is so nearly equal that I would in any case give the patient or the surgeon the choice of the operation. If I were the patient, I should choose the incision as being, on the whole less painful and more rapidly and surely efficacious.

Dyspnœa is one of the most frequent and distressing symptoms associated with Bright's disease. It has various causes, and requires various remedies. When it results from œdema of the lungs, or dropsical hydrothorax, it is best treated by the remedies for dropsy. In some cases, anæmia appears to be the chief cause of dyspnœa. The red blood-corpuscles are the oxygen-carriers. When the blood—whether in cases of chlorosis or of Bright's disease—contains an excess of water with a corresponding deficiency of red corpuscles, the defective oxidation of the tissues—the demand for air—expresses itself in hurried and laborious breathing. The remedy for this form of dyspnœa is to be sought for in the elimination of water, a carefully regulated nutritious diet, and iron as a restorative tonic.

Paroxysmal dyspnœa in some cases appears to be of cardiac origin. The heart's action is rapid and feeble, or slow and feeble, the breathing distressed and hurried, with loud puerile respiration over the lungs. The dyspnœa in these cases seems to be due to the influence of deteriorated blood upon the pulmonary and cardiac nerves. It is not improbable that the cardiac weakness in some cases results from excessive contraction of the minute branches of the coronary arteries, and consequent anæmia of the muscular walls of the heart.

These distressing symptoms are often relieved for a time by ether or brandy; and lately I have found that an occasional small dose (ten grains) of hydrate of chloral has done good. The cardiac and pulmonary symptoms to which I have referred are almost certainly made worse by opium in any form. There seems good reason to believe that in the hydrate of chloral we have a remedy, by the cautious use of which we may for a time mitigate some of the nervous symptoms which occur in the advanced stages of incurable Bright's disease. I refer particularly to the cramps and muscular twitchings, which are frequent precursors of convulsions, and the distressing restlessness which, associated as it is in a greater or less degree with uræmia, is generally agravated by opiates.

The sufferers from Bright's disease are always dyspeptics, and the gastric symptoms are often very obstinate and distressing. When in consequence of renal degeneration the blood is contaminated by retained urinary excreta, there is often a vicarious excretion of these impurities by the mucous membrane of the stomach and bowels. The gastric secretions are mingled with the ammoniacal products of decomposing urea; digestion is consequently impaired; there is flatulent distention of the stomach and bowels, nausea, vomiting, and diarrhœa. Relief is to be sought by a carefully regulated diet, and by giving with the food from ten to twenty drops of dilute hydrochloric acid with a vegetable bitter. A small dose of strychnia, or the tincture of nux vomica, with a mineral acid, is sometimes especially efficacious. Pepsine may sometimes be given with advantage.

In some cases of advanced renal degeneration, the vomiting is so incessant that the patient is to be sustained by nutritive enemata, while iced water only is taken by the stomach. In some instances that have come under my observation, the straining and exhaustive efforts of vomiting have

been checked only by frequent whiffs of chloroform-vapor.—*British Medical Journal, August* 6, 1870, *p.* 135.

43.—ON A NEW TEST FOR ALBUMEN.

By Dr. Charles Meymott Tidy, Joint Lecturer on Chemistry at the London Hospital.

The importance of detecting the presence of a minute trace of albumen in the urine must be my apology for proposing another test, which I am disposed to regard as more delicate than any I have ever tried. It may be that I have practised it more and know its peculiarities better than other tests. I do not propose it as likely to take the place of nitric acid, because it can be so easily obtained, and for all practical purposes shows a sufficiently marked reaction, especially when used in the manner proposed by Dr. Andrew Clark, of floating the urine on the acid, and noting the white layer of coagulated albumen where the two liquids join. I merely venture to propose my test as an exceedingly delicate confirmatory one, and likely, I hope, to be of some service where other tests leave a doubt as to the presence or absence of albumen. I may just say that it first occurred to me in the course of a long series of experiments I am now engaged upon respecting the action of various re-agents upon the aproximate principles of living matter.

The first method I adopted was a mixture of glacial acetic and carbolic acids. I still think this gives satisfactory results, but its preparation requires care. If there is too little acetic acid, the carbolic acid is not thoroughly dissolved when added to the urine, and this renders the liquid slightly opalescent, which appearance might be taken for a trace of albumen. If too much acetic acid is added, then the excess will redissolve the albumen. The plan I adopt is as follows: I mix equal volumes of the two acids, and then see whether, on adding this to a little water in a test-tube, the liquid, after being well shaken, becomes perfectly clear. As a rule, I find this proportion is about correct; but if it does not become clear, I then add a little more acetic acid, trying it after each addition, until the desired point is reached.

The second I have to propose, and which has its advantages, is as follows:—Add to the liquid to be examined in a test-tube ten minims of alcohol (I employ it with a specific gravity of 0·805), shake thoroughly, but *gently*, so as to avoid the production of froth. Then drop in the same quantity of carbolic acid, and shake very thoroughly. Allow it to stand for a minute; and if the merest trace of albumen is present, distinct flocculi will be seen floating in the liquid. The alcohol and carbolic acid may be kept mixed, although I think it is more delicate when the experiment is made by dropping them in separately.

Respecting its delicacy, I may say that I can obtain distinct reactions with quantities of albumen that are undiscoverable by nitric acid, or heat and nitric acid. Distinct flocculi may be noticed with a solution of 1 part of albumen in 15,000 of water: whereas 1 in 8,000 is the smallest quantity discoverable by nitric acid.

I may suggest if we are testing urine that contains such a small quantity as I have named, it will be necessary, in all probability, to filter it before applying the test; but of course this is not required as a rule.

I will just add, that I have not as yet found anything in urine that will give this reaction with the test I have proposed, except albumen.—*Lancet, May* 14, 1870, *p.* 691.

SURGERY.

AMPUTATIONS, FRACTURES, AND DISEASES OF THE BONES, JOINTS, ETC.

44.—AMPUTATION THROUGH THE KNEE-JOINT.

By C. F. Maunder, Esq., Surgeon to the London Hospital.

Amputation through the knee-joint having being lately revived as a substitute for removal of the leg either below or above that articulation, I determined to test its value should a suitable case present itself. The advocates of the method are of opinion that it produces less shock than either removal of the limb at the lower third of the thigh or at the upper third of the leg; that there is less risk of pyæmia, of exfoliation, and of osteomyelitis, because the bone not being severed, neither its cancellous tissue nor medullary cavity are injured or opened. On the other hand, opponents to this operation would probably say acute inflammation of a large and extensive synovial membrane, with its serious effects upon the system generally, will arise and be followed by a prolonged and exhaustive suppuration. Also the cartilage will probably exfoliate, and this process will delay both the healing of the wound and a restoration to health. Under these latter circumstances there will be great danger of retraction of flap or flaps, consequent exposure of the condyles of the femur, and probably a second amputation will be necessary in order to remove these latter. Thus the time of the patient would be wasted, his sufferings would be prolonged, and the risk to life doubled.

The case selected was that of a female, about fifty years of age, the subject of an extensive sloughing ulcer occupying the lower two-thirds of the leg, and in an extreme state of exhaustion, both resulting apparently from want of food. While in hospital cleanliness and a nutritious diet had little or no effect on the character of the ulcer, and at the earnest entreaty of the patient, I at length consented to operate. I feared lest the shock of amputation would kill her. An anterior flap was made from the front of the leg long enough to wrap round the condyles, and a short convex posterior flap was also cut and dissected off the deep fascia. The anterior flap was dissected up to near the level of the line of the articulation, and then the leg was severed from the femur by passing the knife through the articulation from before backwards. At the moment that the hamstring tendons were cut the structures at the back of the femur became enormously retracted—to the extent of from three to four inches—in a longitudinal direction. Knowing full well the tendency to retraction in this region I thought to allow for it by cutting, as already noted, a short posterior skin flap. Then, again, the patient's knee had been contracted for many weeks, the leg being almost bent at a right angle to the thigh; and consequently I judged (falsely as it appeared) that the skin would have already contracted almost as much as it could do by reason of this flexed position of the leg. At first sight it appeared to be necesssary to remove both condyles and patella, in order that the anterior flap might be carried back to meet the posterior. However, on examination, it was found that, although the retraction in the middle line of the limb could not be remedied, still the skin on either side was lax enough to allow of the flaps coming together in such a manner that a T shaped,

instead of a linear, wound resulted. The popliteal vein seemed inclined to bleed, and was ligatured. The arteries were twisted.

Progress of the Case.—A short time after the operation the patient showed little or no sign of shock, and on the following day no one would have guessed that she had been submitted to amputation twenty-four hours before. She progressed uninterruptedly well, and in due time left the hospital able to bear the firm pressure of my hand upon the end of the stump, and with the wound T shaped, not quite healed, situated at the back of the condyles. The patella was only slightly retracted, and was freely movable. A few days after the operation there was some little puffiness round the patella, and the synovial pouch probably became only slightly inflamed, and certainly did not suppurate. An accident which I had foreseen, and endeavoured to guard against, happened. In the first place the stump was wrapped in cotton wool, and loosely rolled with flannel, that no pressure of any kind might act upon it, and then the attendants were warned that if the limb rested on the back of the condyles the margin of anterior flap would slough. Notwithstanding all the precaution taken by me, a portion of the edge of the anterior flap did slough to the extent of some half an inch or more in depth, and thus cicatrisation was delayed. That it was due to direct pressure I have no doubt, because the flap sloughed only on either side of its middle line, leaving a tongue-shaped portion at this point which had corresponded to the fossa between the condyles and where it had escaped pressure.

In all capital operations—amputations, for example—the surgeon's first thought must be for the life of his patient, his second to preserve as useful a limb as possible. I will assume that amputation through the knee fulfills the first consideration, as I believe it will be found to do, and as was the case most certainly in the above example. How is disarticulation to be effected? Often there will be no choice, the condition of the soft parts about the joint dictating the method. The circular makes a hollow cup in which secretions will lodge and putrefy; the method by long posterior flap involves the section of a great mass of muscle, the presence of large nerves which may suffer from pressure, a large suppurating surface, and a tendency of the flap to fall away and expose the condyles; it is undesirable. Lateral flaps might be taken, but none is so convenient as the method by a long anterior and a short posterior. The great desideratum in all amputations is that the patient shall be able to bear his weight upon the end of the stump; and to favour this the extremity of the bone must correspond with sound skin, not with cicatrical tissue. The latter method satisfies this demand. The end of the bone is covered by skin accustomed to pressure, the anterior flap falls naturally into position and secretions can readily escape. Thus, then, sound principles of surgery are followed; but there is one other requisite to insure success, and that is, care and attention to the position of the stump during the progress of repair. A surgeon cannot be always with his patient, and notwithstanding repeated advice and warning given to the attendants an accident may happen as in my case—sloughing of the free end of the long flap from pressure. This possibility leads to the consideration of the question; shall a single long flap be cut at the risk of sloughing from carelessness, or shall the chance of sloughing be met by preserving a short posterior flap also? I incline to the latter method, since by it also, where so long an anterior flap is not requisite more amputations may possibly be performed. In this operation large processes of bone are to be preserved, and to prevent their subsequent exposure at the sides of the bases of the flaps, the actual line of the bases of these flaps should be a finger's breadth below the level of the articulation. Also, the anterior flap should be wide, being begun and terminated on either side towards the popliteal space.

The operation consists in the formation of a long wide anterior flap, having a base as above mentioned, and an extremity not less than two and a half inches below the tubercle of the tibia when the limb is extended. This having been dissected up, without scoring of its deep surface, to near

the joint level, a narrow-bladed knife should traverse the articulation from before backwards, either after the posterior flap has been cut and dissected up or prior to its formation from within outwards. The posterior flap should extend as low as a point corresponding to the level of the lower end of the tubercle of the tibia.

N. B.—If from any cause the flap or flaps should prove too short, the removal by the saw of that portion of each condyle which projects backwards beyond the level of the posterior surface of the femur just above, will be equivalent to adding one inch in length to flaps.

While disarticulating, care should be taken not to injure the articular cartilage; the patella should scarcely be seen, and the synovial sac should not be unnecessarily disturbed. The interarticular fibro-cartilages should be taken away with the tibia. When cutting the posterior flap from within outwards the position of the head of the fibula must be remembered lest it prove an obstacle to the free use of the knife. The leg is to be flexed during disarticulation as in excision of the knee; and also an assistant with both hands must retract the integuments from about the condyles.

To repeat: The chief points to be remembered in reference to this operation are:—(*a*)The soft parts in the popliteal space are liable to become extremely retracted; (*b*) the extremity of the long flap will slough if exposed to direct pressure.

Probably the reason why the integument of the popliteal space is so very elastic is that it may not be thrown into folds and exposed to painful compression during flexion of the leg upon the thigh.

P. S.—To-day, June 28, and about six months since the operation, the patient came to the hospital. A more elegant or useful stump cannot be imagined.—*Medical Times and Gazette, July* 2, 1870, *p.* 4.

45.—ON AMPUTATION BY A CURTAIN FLAP OF INTEGUMENT, WITH SPECIAL REFERENCE TO THE THIGH, WITH CASES.

By John D. Hill, Esq., Surgeon to the Royal Free Hospital, and Assistant-Surgeon to the Royal Orthopædic Hospital.

Integument forms the chief covering of those parts of the lower extremities which are destined to bear weight or pressure, as the os calcis, patella, and tuber ischii exemplifying in the respective postures of standing, kneeling and sitting.

When, therefore, accident or disease requires some new point to support the whole or a part of the weight of the body, the same structure would seem best adapted as a covering to the bone. I refer to amputation at the lower extremity, and especially the thigh.

Now, my own results hitherto tend to show that an integument flap has decided advantages over a muscular flap, circular or an oblique amputation—firstly, with respect to the construction of the stump and its influence upon the process of repair; secondly, as to the ultimate use of the extremity. Perhaps the following method may be regarded as the type of this operation :—

One half the circumference of the limb having been spanned, an anterior U shaped or rounded flap of integument is cut, from four and a half to six inches in length. This is dissected off the deep fascia to the point where the bone is to be sawn. A slightly curved incision is then carried accross the back of the limb, also separating integument from fascia. The flaps now being drawn back, a circular sweep severs all structures to the bone, which is then sawn across. Hemorrhage having been arrested by torsion, or ligature, the flaps are brought together, and when complete, the line of suture will be at the posterior and inferior margin of the stump.

Now, this method combines the advantages of the circular and Teale's rectangular operations; and although there may be nothing new to relate, I would just venture to recite the following points in its favour :—

1. We have a flap which by its own weight falls over the face of the stump, like a curtain, requiring little or no pressure or support to keep it in position.

2. The muscles being cut short, spasmodic or continued traction of their fibres produces no disturbance of the flaps, nor separation of the edges of the wound, and ultimately there is little danger of what is termed a conical stump.

3. The large vessels and nerves, muscles and fascia, being cut transversely and in a line with the bone section, their relative position is but slightly disturbed, thus, the danger of pyæmia, phlebitis, deep-seated suppuration, and other complications, is lessened, and every facility is afforded for primary union.

4. The line of suture being at the posterior inferior margin of the stump, the wound is placed in the most favourable situation for healing, whether by first or second intention. Moreover, manipulation of the flaps being unnecessary in the after drssing of the stump, the latter is acomplished with the least amount of discomfort to the patient.

5. The cicatrix contracting, draws the sound integument further over the end of the bone, and, receding from the point where pressure will be exerted in the subsequent use of an artificial limb, it is ultimately found about two inches above the original line of incision.

6. The integument is moveable over the extremity of the bone, a point of importance as to the adjustment of pressure in an artificial limb.

7. Firm pressure can be borne upon the end of the stump when the wound is cicatrised, and ultimately the whole weight of the body, if required.

Thus we have a well-fashioned stump, rendering every facility for healing, and admirably adapted for ultimate pressure. Now, it may be suggested that the length of the anterior flap will in many cases of injury render the operation impracticable. This difficulty may be met by modifying the length, situation, and axis of the flaps according to circumstances. Again, it may be doubted whether the length and pendant position of the anterior flap will not threaten its vitality—indeed, slight congestion of the extremity has sometimes occasioned me such apprehensions. This, however, has always disappeared on elevating the stump and applying slight support to the flap, and in no case can I ascribe sloughing to its length or position.

Another objection may be urged as to muscular retraction after section tending to produce a conical stump. Should this immediately follow the knife, perhaps it would be advisable to saw the bone rather higher up, and obviate further retraction by keeping the limb well bandaged from above downwards.

In five cases where I performed primary amputation through the femur and humerus respectively, such retraction occurred only in one instance—a fortnight after operation; but this was remedied by so bandaging the limb.—*Medical Press and Circular, April* 20, 1870, *p.* 308.

46.—ON REFRACTURE OF BONES.

By Frederick C. Skey, Esq., C.B., F.R.S., Consulting Surgeon to St. Bartholomew's Hospital.

I know of few better examples of sound effective surgery than results from the successful treatment of a case of a distorted and contracted limb, *by reason of* the mal-union of a broken bone, by its refracture. In the

case of a broken femur, for example, it not infrequently occurs that, whether owing to imperfect extension, to a restless disposition on the part of the patient, or a discontented character of mind, which impels him to regulate the pressure of the splints in accordance with his own sensations, and especially in cases of a every oblique fracture, the bones may permanently overlap, and an angle is frequently formed at the point of union. In proportion to the shortening of the limb is the gait impaired, and the muscles are reduced in contractile power. In such cases the bone may be refractured with perfect safety. Do not suppose that the capability to employ the limb in walking is any evidence of your inability to break it. In a case of simple oblique fracture of the femur, or of the bones of the leg, the patient may be capable of walking—that is, of throwing the entire weight of his body on the affected limb in the course of seven or eight weeks ; but the weight being vertical the uniting tissues are firm enough to sustain the superincumbent weight ; but if force be applied in a lateral direction, the union will readily separate for many weeks afterwards. I have broken the femur at the expiration of eleven weeks, and the bones of the forearm at that of seventeen.

Two important questions arise in connection with this subject :—

1. Will the bone thus broken again reunite ? Why should it not ? If nature has firmly united the broken bone in the first instance, why should she not in the second ? The power of uniting a broken bone is inherent in every sound constitution. The very fact of primary union infers the presence of ossific power.

The second objection which has been raised is the uncertainty of separating the bones at the point of fracture. This is a frivolous objection, If a man of good muscular power fails with his greatest effort to break even a radius in the dried state, how can the shaft of the femur be broken by the muscular power of the human arm ?

Granted (1) the impracticability of fracturing a living bone of the smallest calibre for which the operation of refracture can be required ; (2) the all but certainty of reunion ; (3) the simple and innocuous nature of the operation as regards the soft structures ; and (4), the perfect safety of the shaft of the bone. What objection can be urged against an operation which contemplates the removal of a serious evil to the frame without suffering or inconvenience ? The only limit to time is the power to break. I made a vigorous attempt to break the femur at ten months. In this I failed, but the man walked back to his ward without pain or difficulty. Chloroform having been administered, the limb is brought to the edge of the table, which is covered with half a dozen folds of a blanket. The weight of the body of the operator is brought slowly and gradually to bear on the point of fracture ; and any additional force in moderation may be resorted to. The separation will be audible to bystanders, and when the rotation of the lower fragment proves the entire separation of the fractured ends, the movements should be freely made with a view to detach all the fibrous adhesions yet connecting them. The sensation to the surgeon manipulating is not that allied to crepitus. The impression conveyed to the hand has nothing of the crispness caused by a recent fracture, but rather like the laceration of soft or fibro-cartilaginous substance yielding under continuous pressure. Pulleys very deliberately applied are requisite to overcome the long-continued contraction of the muscles. The artery has been abnormally shortened, and will rejoice in its restoration.—*Lancet, September* 17, 1870, *p.* 395.

47.—CASE OF TRANSVERSE FRACTURE OF PATELLA WITH OSSEOUS UNION, TREATED WITH GUTTA-PERCHA SPLINTS.

By JOHN WOODMAN, Esq., Honorary Surgeon to Exeter Dispensary.

On the evening of August 21, 1869, W. E., aged 32, a smith and fireman and a musular man, was running quickly in the street on an alarm of fire, when he tripped, and to save himself from falling, threw himself backwards, and in doing so felt something snap in his knee, and fell down. He was brought to my house, and attended to in my temporary absence by my neighbor, Mr. S. Perkins.

On the following morning I saw him, and found on examination that the left patella was transversely fractured and that the two portions were entirely separated, being drawn widely apart on the slightest attempt to bend the knee. I brought the two portions together with strips of sticking-plaster and a figure of eight bandage, and placed the leg on an inclined plane, with the heel a foot higher than the hip, but finding it impossible to keep them in perfect apposition in this way, on the 23d I moulded a gutta-percha splint to the front of the knee, cut a hole in it exactly the size of the patella, and then applied this, padded with a little cotton-wool, and another gutta-percha splint for the back of the leg, keeping them moderately tight with a bandage, so as to press the patella through the hole in the splint, and thus hold the two portions firmly together. This answered the purpose admirably, and gave him no inconvenience at all. He was kept like this, with his leg on the incline for about six weeks, and when he moved about he wore a light wooden splint with the front gutta-percha one, with a portion cut off to make it lighter. He was very anxious not to strain the knee, and kept the back splint on for nearly five months, whilst working at his trade.

I saw him on July 16, 1870, just eleven months after the accident, and found the bone perfectly united with osseous union, so much so as to render it almost impossible to detect the seat of the fracture; the edges of the bone are quite natural and smooth, and only a slight irregularity in the middle of the surface of the front of the patella can be detected on a minute examination. He can use the leg very well; although he cannot bend it quite as much as the other, still it is fast improving. His own remark was, "It is stronger than the other knee, and I have tried it very much in my trade" (a blacksmith).

The success in this case I attribute entirely to my being able to keep the two portions of the bone in such perfect apposition. As the plan is so simple I dare say it may have been tried before, still, as I cannot find it mentioned in any of the text books on surgery, there may be some of my professional brethren to whom the case may be of interest, especially as I see Erichsen says that only two or three cases of osseous union are on record—*Medical Times and Gazette, August* 20, 1870, *p.* 204.

48.—FLANNEL AND PLASTER OF PARIS SPLINT.

By CHRISTOPHER HEATH, Esq., Surgeon to University College Hospital.

Mr Heath describes a splint recently introduced from Germany. It is easily made, and forms an efficient substiute for the expensive and troublesom · leather splint. It is made as follows :—a piece of flannel folded into a do ible layer is laid underneath the leg; by gathering it up on either side, so as to make its edges meet over the crest of the tibia, and the dorsum of the foot, and cutting off what is superfluous, it is adapted to the shape of the parts. The same is accomplished for the foot-piece by cutting out the fold which results from bringing together over the middle line of the sole the opposite sides of the end of the flannel. Then, as a guide to the

next step, a line is drawn in continuation of the middle line of the sole, along the under surface of the leg, and through the part corresponding to the centre of the popliteal space. Next, the flannel being removed, the two layers are united by two lines of stitching, about a quarter of an inch apart, and one on either side of the guiding line. The flannel is then accurately replaced, and the layer adjacent to the skin pinned in position, while the outer one is allowed to drop and hang from the double row of stitches on the under surface. The outer surface of the inner layer having been spread with plaster of Paris to a depth of about two lines, the other layer is brought up on either side of the leg and foot, and accurately adjusted to the first, to which it soon becomes adherent, while the entire structure sets into a firm and solid splint. It admits of no eversion at the edges, and the coherence conferred by the texture of the flannel counteracts the brittleness and the tendency to crack spontaneously, which are liable to give trouble with plaster of Paris as usually applied. The splint can be maintained in position by bandages and strapping. The thin line of flannel, which has been kept free from plaster by the double row of stitches, and preserves its pliancy, forms a hinge, which enables the splint to be removed and readjusted as often as occasion may require.—*Lancet, October* 1, 1870, *p.* 469.

49.—NEW MATERIAL FOR SPLINTS.

Mr. HUTCHINSON has recently been trying hatters' felt for splints. It can be obtained at any hatter's, is cut to the required shape, dipped in hot water, which softens it, and it is then moulded to the limb. As it dries it stiffens, and forms an excellent support. There are several cases in the hospital now in which it has answered capitally in children. It has not been tried yet, we believe, for adults.—*Medical Times and Gazette, August* 13, 1870, *p.* 174.

50.—FURTHER EVIDENCE REGARDING THE EFFECTS OF THE ANTISEPTIC SYSTEM OF TREATMENT UPON THE SALUBRITY OF A SURGICAL HOSPITAL.

By JOSEPH LISTER, Esq., F.R.S., Professor of Clinical Surgery in the University of Edinburgh.

[Dr. Saxtorph of Copenhagen having written to Professor Lister an interesting letter showing the great success of the antiseptic plan of treatment in the Frederick's Hospital of that city, Professor Lister naturally asks how it is that similar results have not been obtained in England.]

It may seem strange that results like these should have been obtained in Copenhagen, when so little approach to them has yet been made in the capital of England. The fact, however, is not difficult to explain. Want of success in many quarters has not arisen from any unwillingness to try a new mode of practice. On the contrary, the publication of my first papers was followed by a very general employment of the material which I happened to select for carrying out the treatment, and which, unfortunately for the principle involved was then little known in British surgery, so that the striking results which were recorded were too often attributed to some specific virtue in the agent. The antiseptic system does not owe its efficacy to any such cause, nor can it be taught by any rule of thumb. One rule, indeed, there is of universal application—namely, this: *Whatever be the antiseptic means employed* (and they may be very various), *use them so as to render impossible the existence of a living septic organism in the part concerned.* But the carrying out of this rule implies a conviction of the truth of the germ theory of putrefaction, which, unfortunately, is in this country the subject of doubts such as I confess surprise me, considering the character

of the evidence which has been adduced in support of it. Yet without this guiding principle, many parts of the treatment would be unmeaning; and the surgeon, even if he should attempt the servile imitation of a practice which he did not understand, would be constantly liable to deviate from the proper course in some apparently trivial, but essential detail, and then, ignorant of his own mistake, would attribute the bad result to imperfection of the method. For my own part, I find that, in order to approach more and more to uniform success, it is necessary to act ever more strictly in accordance with the dictates of the germ theory. Failure on the part of those who doubt or disbelieve it is therefore only what I should expect.

Another great cause of failure, undoubtedly, is the careful attention necessary in order to exclude, from first to last, the subtle putrefactive organisms that people the atmosphere and form part of the dust which adheres to all exposed objects. The germ theory, while it furnishes the clue to success, affords ample explanation of failure. I believe I do my professional brethren in Britain no more than justice when I say that if they felt anything like the assurance expressed in Professor Saxtorph's words, "the reward is certain, they would not grudge a greater degree of trouble than the antiseptic treatment demands. And, in truth, when once a surgeon has become thoroughly initiated into the practice, it is in most cases a saving of trouble. Thus I have at present a patient about to leave the infirmary three weeks after the removal of the entire mamma for scirrhus, all the axillary glands having been at the same time cleared out after division of both the pectoral muscles, so as to permit the shoulder to be thrown back and the axilla freely exposed, as is done in the dissecting room—a practice which I have for some years adopted where the lymphatic glands are affected in that disease. In this case a great deal of care was certainly required for the first few days; but after a week the dressings were only changed once in three days, and when a fortnight had elapsed, cicatrisation being almost perfect, a week was allowed to pass without any interference. Hence, on the whole, the labour was considerably less than with ordinary treatment, and a very much greater amount of pains would have been amply repaid by the beautiful linear cicatrix, formed without the occurrence of one drop of pus, and without any serious constitutional disturbance. This, however, was an instance in which an unusual degree of care was requisite; for the axilla is one of the most difficult situations in the body to guard antiseptically, and I have only myself learnt quite recently the art of doing this, as I believe, with security. But in most cases the details of the treatment are not troublesome to execute by any one accustomed to them; yet they nevertheless require at first earnest practical study until their employment has become habitual and instinctive. It is therefore not to be wondered at that surgeons endeavouring to carry out the treatment without having seen it in operation, and only half persuaded of the importance of the object to be attained, should fail time after time, and throwiup the attempt in disgust. Professor Saxtorth, on the other hand, having observed the effects of the antiseptic treatment, and appreciated its mportance, spent a considerable time in carefully watching it in operation, and then set to work in right good earnest to carry it out; and, as he believes in the germ theory of putrefaction, it is not surprising that sound principle and careful practice should have been crowned with the succes swhich he has related.

I had not intended to have published anything regarding the general condition of my wards in Edinburgh till a longer period should have elapsed. But in connexion with Professor Saxtorph's letter I may state that, having now been in charge of fifty beds for nine months in the Royal Infirmary here, I have as yet had no instance of pyæmia, although many cases have been admitted in which it might, under ordinary treatment, have been apprehended, such as compound fractures, amputations in the lower limb, and extensive gouging operations upon bone. Hospital gangrene also has been entirely absent. Though several cases of ulcers of long standing have been under treatment, there has never been any ap-

pearance of greyness of the surface to indicate even the mildest form of the disease.

Two cases of superficial erysipelas occurred in December; but these seemed to me attributable to cold rather than to any poisonous condition of the atmosphere. In my former paper on this subject I mentioned a case in which erysipelas appeared in a stump after amputation of a leg, long after the patient had left the Glasgow Infirmary with the wound entirely cicatrised, and I remarked upon the interest of that case as occupying an intermediate position between traumatic and idiopathic erysipelas, implying that local irritation of such trivial nature as that of a contracting cicatrix might determine the occurrence of the complaint in a person predisposed to it constitutionally. We know also that exposure to cold is the most common exciting cause of the idiopathic form of the disease, which is entirely independent of any unhealthy state of the air. It therefore seems not unreasonable to suppose that where the local irrition of a wound coexists with a chill, traumatic erysipelatous inflammation may become developed in some persons in a perfectly pure atmosphere; and such seemed the most probable explanation of the two cases to which I am now referring. One of them was a man above the middle period of life, in whom I had performed amputation at the knee-joint. Five days after the operation, the discharge amounting to only a few minims of serum in the twenty-four hours, and the patient being free from constitutional symptoms, I thought him a favourable subject for illustrating the antiseptic dressing of a stump before the clinical class. Accordingly I had him taken into the theatre, and dressed him there; and, not thinking how time was passing, I left the stump covered only with a piece of calico soaked with cold watery solution of carbolic acid while I discussed at considerable length the mode of procedure. It happened to be one of the coldest days of that severe winter, and it afterwards occurred to me that I had been guilty of imprudence in exposing the stump so long. Next day he complained of not feeling so well, and the skin near the wound exhibited the commencement of an erysipelatous blush, which spread some distance up the trunk before it finally subsided. The other case was one of removal of the mamma for scirrhus. In changing the dressings the exposed surface of the chest was syringed with the cold watery solution of carbolic acid, and, in that very cold weather, a chill was certainly not unlikely to occur from such treatment. Here also a blush of redness appeared near the wound, and, though it was only superficial and did not spread far, it was unmistakably erysipelatous. Taking this view of the cause of the complaint in these two cases, I adopted the simple expedient of making the 1 to 40 watery solution of carbolic acid by mixing that of the strength 1 to 20 with an equal quantity of hot water, so as to make a warm lotion; and during the seven months in which this plan has been pursued we have had no more appearance of erysipelas.

Thus my wards, although by no means models, as regards their principle of construction or the space allowed between the beds, appear perfectly free from any liability to hospital diseases.—*Lancet, Aug.* 27, 1870, *p.* 287.

51.—A METHOD OF ANTISEPTIC TREATMENT, APPLICABLE TO WOUNDED SOLDIERS IN THE PRESENT WAR.

By JOSEPH LISTER, Esq., F.R.S., Regius Professor of Surgery, University of Edinburgh, and Surgeon to the Royal Infirmary.

Having been requested to furnish some rules for the antiseptic treatment of wounded soldiers in the present war, I venture to suggest the following plan, in the hope that it will combine efficiency with the simplicity and facility of execution essential under such circumstances.

Wash the wound thoroughly, and also the surrounding skin, with a

saturated solution of crystallised carbolic (phenic) acid in water, one part of the acid to twenty of water, introducing the fluid by means of a syringe, and manipulating the parts freely so as to cause the lotion to penetrate into all the interstices of the wound; and at the same time squeeze out such clots of blood as it may contain. The fluid should be introduced repeatedly to insure its thorough penetration. Tie any bleeding vessels with properly prepared antiseptic catgut, cutting off the ends of the thread near the knot. If the surgeon do not possess this article, the arteries should, if possible, be secured by torsion; but for the sake of cases in which a ligature would be absolutely indispensable, some silk or linen thread should be kept steeping in a strong oily solution of carbolic acid, or, if very fine silk be used, it may be rendered antiseptic by steeping for a few minutes in the watery solution. When silk or linen is employed, the ends of the ligatures should be left projecting at the wound. While the antiseptic lotion is in the wound, extract if possible, any foreign material that may have been introduced, such as a bullet or a portion of the patient's clothes; and if any spicula of bone exist entirely detached from the soft parts, remove such as can be readily reached, disregarding those which are of very small size or inconvenient of access. Then place upon the wound two or three layers of oiled silk smeared on both sides with a solution of carbolic acid in five parts of any of the fixed oils—olive, almond, linseed, &c.—the oiled silk being made large enough to cover the raw surface completely and slightly overlap the surrounding skin. Next apply, without loss of time, lint, charpie, or cloth (linen or cotton,) well steeped in the oily solution of the acid, the cloth or lint being folded sufficiently to produce a layer at least a quarter of an inch in thickness, and extending a considerable distance, say three inches, beyond the oiled silk in all directions, the outer layer being made somewhat larger than the rest, so that the margin of the mass of cloth may be thin. Cover the oily cloth with a piece of thin gutta-percha tissue sufficiently large to over-lap it on all sides by an inch or more, and retain it securely in position by a roller steeped in the antiseptic oil. Round this again wrap a still larger piece of folded cloth, say a folded towel, also steeped in the oily solution of carbolic acid, and cover it with a piece of oiled silk or gutta-percha.

With a view to the intelligent application of this dressing, it will be well to state briefly its *rationale*. The watery solution is applied in order to destroy once for all any septic particles that may have been introduced into the wound; and the oily solution is employed to prevent the spread of putrefractive fermentation into the wound from without. The oiled silk, which is but slightly permeable to carbolic acid, protects the raw surface from irritation of the acid in the oily cloth, and permits it to heal as under a scab. But though the ultimate office of the oiled silk is to protect the wound from the irritation of the antiseptic, it must itself be antiseptic at the time of application, and is therefore smeared with the oil, which in the course of no long time loses its carbolic acid by diffusion into the wound beneath. The substantial and widely extending oily cloth serves as a store of the antiseptic; but the bloody and serous discharge soaking into the porous cloth tends to wash away the oil and deprive the dressing of its antiseptic character; hence the necessity for the gutta-percha, which prevents the discharge from making its way directly outwards from the wound, and so establishing a road for the penetration of putrefaction inwards. At the same time the gutta-percha, though impermeable to watery or oily fluid, being readily permeated by carbolic acid, permits the antiseptic ingredient to pass in through it from the outer cloth and act upon the discharge that flows out beneath the overlapping margins of the gutta-percha. The outer cloth is intended to be changed as occasion may require, in order to keep up the supply of the antiseptic, while the gutta-percha and all beneath it constitute a more permanent application. The layer of gutta-percha or oiled silk outside *the external cloth* is to prevent the oil in that cloth from being wasted by

soaking out into the surrounding articles of clothing, &c.; or, still worse, neutralised chemically by the penetration inwards of putrid blood or other discharges from the ambulance wagon or bedding. The circumferential part of the deeper cloth will, in consequence of its thinness, be kept completely antiseptic by the carbolic acid which passes inwards through the gutta-percha, while the deeper layers of the thicker portion over the wound will probably in a few days be destitute of antiseptic, and therefore of stimulating, properties; hence the oiled silk, though desirable in order to insure the absence of "antiseptic suppuration," is by no means an essential part of the treatment, and if none of it be at hand the procedure may in other respects be conducted in the same way without it. Again, if the surgeon have no gutta-percha at his disposal, the risk that would otherwise arise from the permeability of the dressing may be overcome by frequently changing an external antiseptic cloth, or by treating its surface every few hours with the antiseptic oil.

The changing of the outer cloth will require care in order to avoid raising the edge of the gutta-percha along with it, and so admitting septic air towards the wound. It may be done with perfect security by having the cloth consist of two parts, one covering each half of the gutta-percha, and, as one half is raised, throwing a stream of watery solution (1 to 40) with a syringe upon the margin of the gutta-percha, a fresh oiled cloth being at once applied before the other portion of the former cloth is removed. If sufficient time cannot be spared for changing the outer cloth in this careful manner, it will be better for the surgeon to content himself with pouring fresh oily solution upon the exterior of the cloth without disturbing it, taking care that the oil enter well beneath its margins. I would advise that this should be done in preference where a large number of wounded have to be treated by one surgeon.

The strong oily solution (1 to 5) would irritate the skin if used continuously: after the first dressing a solution of half the strength should be employed, and after a few days it may be reduced to 1 to 20 if excoriation should occur.

The times of changing the outer cloth, or treating it with fresh oil, should be in accordance with the amount of discharge. During the first twenty-four hours the effusion of blood and serum is necessarily profuse, and it will be well that fresh oil be applied to the outer cloth within twelve hours of the first dressing, or even in six hours if there should be unusual oozing. On the second day, also, in the case of a large wound, two dressings in the twenty-four hours will be desirable. After this, if all go well, the discharge will diminish quickly, and a daily renewal of the antiseptic supply will be sufficient; and when five or six days have passed, to apply the oil once in two days will be all that will be required. This, however, should be continued after discharge has ceased entirely, till sufficient time has passed to insure that the wound has healed by scabbing, or at least has been converted into a superficial sore.

The earlier the case comes under treatment the greater will be the prospect of success, but even after the lapse of thirty-six hours it need not be altogether despaired of.

In the case of compound fractures, the essential objects of the treatment may be attained by using splints constructed of stout iron wire bent into the form of the margin of a lateral splint, and strengthened by cross pieces here and there. Such splints can be readily extemporised by the surgeon himself, by help of two pairs of wire-forceps. The splints should be applied one at each side of the limb, without any padding opposite the seat of injury except the dressing above described, but padded elsewhere with any suitable soft material, an interval being left between such padding and the dressing. The outer layer of oiled-silk or gutta-percha should be applied outside the splints, so that all that will be requisite in order to apply oil to the outer cloth will be to take off the oiled silk with its retaining bandage, and pour on the oil through the ample intervals between the wires. Or the splints might be applied

immediately external to the bandage that retains the deeper layer of gutta-percha, leaving the outer cloth to be wrapped round external to the splints, cotton or charpie imbued with the antiseptic oil being tucked in under the splints to keep the margins of the gutta-percha in apposition with the limb, the cotton being changed as often as the cloth itself.

For the sake of the general healthiness of the atmosphere of the crowded military hospitals, it is extremely desirable that even superficial granulating sores should be treated antiseptically. This may be done consistently with rapid healing by washing the sore with watery solution of carbolic acid (one to twenty), and covering it with two or three layers of oiled silk smeared with the oily solution (one to twenty), with well overlapping folded cloth steeped in similar oil, and over all a piece of gutta-percha tissue and bandage.

I have suggested in the above method the employment of such materials as are likely to be accessible to the surgeons of both armies. Other means exist, in some respects very superior. But the supply of these is at present limited, and those who possess them probably understand their use.—*British Medical Journal, Sept.* 3, 1870, *p.* 243.

52.—OBSERVATIONS ON THE USE OF CARBOLIC ACID IN SURGERY.

By Edward R. Bickersteth, Esq., Surgeon to the Liverpool Royal Infirmary.

[The following cases are very demonstrative of the advantages to be derived by the adoption of the antiseptic treatment, by which suppuration is almost altogether prevented, and the risks arising from the exposure of deep tissues to atmospheric agencies very much lessened.]

Case 1.—*Suppurative synovitis of the knee-joint in an old man; the joint opened and washed out with carbolic lotion; recovery without subsequent suppuration, and with a movable joint.*—James K., a feeble old man, who said he was only 60 years of age, but looked much older, was admitted into No. 6 ward, on March 24, 1869. He stated that pain and swelling had existed in the left knee for upwards of a month, but that he had continued to work as a labourer till a week before admission. The joint was much swollen, and the patella floating from synovial effusion; and there was so much general febrile disturbance of the system that I suspected suppuration was commencing.

The limb was placed in a M'Intyre splint. Linimentum iodi was freely applied over the lower half of the thigh and the upper half of the leg, but not over the joint, which was ordered to be constantly fomented. Under this local treatment and appropriate general management there was decided alteration of the general symptoms, and the swelling of the leg decreased for a few days; but afterwards the swelling of the thigh was observed to have increased, and, from the extent and position of the fluctuation, it was obvious that the effusion within the joint had escaped beyond the synovial capsule and had penetrated among the deep muscles. On April 5th I introduced an ordinary hydrocele trocar on the outer side of the joint, and drew off about three ounces of thick synovial fluid, which was followed by upwards of an ounce of pure pus. Fomentations were persevered with, but the iodine liniment was discontinued. For a few days after this procedure there was some improvement in the general condition of the patient, and apparently of the limb; but very soon the swelling increased, and became larger than before, extending upwards as high as the upper third of the thigh. Fluctuation was very perceptible, and the skin became red and œdematous over the lower and lateral surfaces. No doubt could now exist that the joint was full of pus, which was making its way upwards among the deep muscles around the femur.

The prospect of affording relief by laying open the joint, in an old man

of feeble constitution, exhausted by long confinement and suffering, was almost hopeless, and I should have despaired under the ordinary plan of operating. By strictly adhering to the rules and principles of the antiseptic treatment I believed that the contents of the cavity might be safely evacuated, and that then, the principal source of irritation being removed, resolution and repair would take place. On April 14th, under the protection of carbolic oil, which was constantly smeared over the part during the whole of the operation, I made an incision four inches in length, on the outer side of the joint, and opened the articulation, giving vent to a large quantity of thick purulent matter. By making pressure around the thigh and the joint, I then endeavoured to empty the cavity entirely, and while this was done the entrance of air was prevented by keeping folds of lint soaked in the oil over the incision. But I found it impossible to press out all the pus, and as I considered this a matter of great importance, and had moreover frequently observed the good effects of washing out the cavities of deep-seated abscesses with carbolic lotion, I determined to do this in the present case. Passing my finger into the joint along with the nozzle of the injecting syringe, I threw in upwards of a pint of the watery solution (1 in 40), thoroughly washing out the whole cavity of the joint and of the abscess. The fluid was then pressed out, the same care being taken as before to prevent the entrance of air. I felt the cartilaginous surface of the joint softened and flocculent. The thigh was supported by a many-tailed bandage, so as to keep the walls of the abscess in contact, and the wound was protected by oiled lint. So much oozing, however, continued to come from the incision that I was reluctantly compelled to remove the covering, and plug the wound with lint soaked in carbolic oil, which I covered with a pad of oiled lint having oil-silk over it, and cotton wool and a bandage over that again. I directed the plugs to be removed after twelve hours, but, unfortunately, at the time of removal the bleeding recurred, and it was necessary to replace similar ones and dress the incision as before.

On the third day after the operation the plugs of lint were carefully removed under the protection of carbolic oil, and three thicknesses of lint soaked in the oil were then placed over the incision, overlapping it at least two inches every way, and secured in position by tapes. Over these were laid three other layers, with oil-silk over all; and each day these latter were renewed and the deeper ones resaturated with oil. Not a trace of suppuration was observed till the 23rd (nine days after the operation), when, on pressing the deep folds of lint, a drop or two of pus exuded. They were therefore renewed, but the wound was not looked at, because as the old protection was drawn off another was slipped on.

For the succeeding five weeks nothing was done beyond the daily removal of the upper layers of the lint. Once or twice it was thought that a drop or two of semi-purulent matter exuded when the under pieces of lint were pressed, but the quantity was so small as to be doubtful. The swelling of the thigh disappeared, and the knee resumed its natural size and shape, so that the bandages encircling these parts required to be frequently tightened. The general state of the man improved greatly.

On May 28th I ventured to remove all the dressings and inspect the wound. It had healed soundly except at the upper part, where a small fistulous opening existed, from which I pressed four or five drops of pus. The carbolic dressings were replaced immediately. Three days afterwards (May 31st) a few drops of pus were observed, and the wound was again exposed, when the small aperture before noticed was found to have enlarged considerably, and a substance looking like a piece of fat, of the size of a small walnut, fell out. This proved to be one of the plugs of lint, which had thus remained embedded for upwards of six weeks. The cavity from which it escaped was lined with healthy granulations, and had no connexion with the joint. It healed in a few days with simple dressings.

On June 5th the limb was removed from the M'Intyre splint, and placed over an ordinary bed-pillow supported on either side with sand-bags. Pas-

sive movements of the joint were then commenced, and after a few days the patient was able to raise the limb without assistance, and to bend the joint slightly. On July 10th he walked with the assistance of a stick, and soon afterwards was well enough to leave the hospital at his own request.

Case 2.—*Chronic disease of knee-joint in a boy aged eleven; suppuration in joint; rupture of matter into tissues of thigh, and formation of chronic abscess; evacuation of abscess, and recovery without any subsequent suppuration.*—The patient, a boy aged 11, had suffered for some time before coming under my care from strumous enlargement of the left-knee joint. The joint had at one time almost got well, but not very long before I saw him the boy had slightly injured it, the swelling had reappeared, and matter had formed in the joint and eventually burst into the tissues of the thigh. When brought to Liverpool the patient was attenuated and worn out to the last degree. The sound thigh was a mere spindle not much thicker than a man's wrist, while the diseased one presented the appearance of a great shaking bag of matter, extending from the upper third of the thigh down to the knee, and equal to about two-thirds the circumference of the lad's chest. It was plain that the pus was to be evacuated, but it was equally plain that if the abscess was opened in the usual manner, and poultices applied, the risk of exhaustive suppuration would be so great as to give the patient, in his enfeebled condition, very slight chance of recovery. It was determined to use the antiseptic method, which at that time consisted in the use of the carbolic putty (made of carbolic oil and whitening) and a covering of tin-foil. On Nov. 30th, 1868, therefore, chloroform was administered, and a free incision was made on each side of the joint, an antiseptic curtain of lint dipped in carbolic oil being instantly let fall over each wound. An immense quantity of pus flowed out beneath the curtains, and the abscess was then completely emptied by pressure. A layer of carbolic putty, spread on linen, and larger than the curtains, was then applied over each, and above these again pieces of soft tin-foil, and finally strips of interrupted bandage to keep all in place. The curtains were retained in position by tapes passing round the thigh. The leg was then placed upon a light iron splint reaching up to the buttock, and provided with a foot-piece, which was slung in a cradle.

The patient recovered well from the chloroform, and his progress from that day was uninterruptedly favourable. Each morning, and for the first few days each evening also, the carbolic putty was renewed, and the tinfoil and strips of bandage replaced; but the curtains were carefully left untouched, being merely resaturated with oil. The thigh was gently pressed from above downwards, in order to make sure that no matter was accumulating in the upper part of the old abscess; and, after a few days, a bandage was put on at that part, so as to consolidate and keep the tissues supported. The boy's appetite returned at once after the operation; and the improvement in his general condition was most marked and rapid. He had anything to eat that was nourishing and digestible, drank some porter and a glass or two of sherry each day, and had a tonic mixture and cod-liver oil.

The daily history of the case need not be detailed. The curtains were not removed for a week; at the end of which time new ones were supplied, being slipped down over the old ones as the latter were drawn away, so that the wounds were never exposed. This treatment was diligently pursued (new curtains being supplied every week or ten days) for a period of five or six weeks; and not till then were the wounds looked at, a liberal dose of oil being allowed to flow over them during their momentary inspection. It was found that the edges of the incisions had gaped considerably; but they were filled up by smooth, pale, inactive granulations at each end for about two-thirds of their whole extent. In the centre of each was a yellow looking portion, over which the granulations did not extend; and some old cheesy flakes of pus, the remains of what escaped at the time of operation, were lying about these parts. *During all these weeks, from the hour of the operation, there never exuded more than one or two drops of pus daily from*

the incisions. The former dressings were again renewed, as the child's parent's were anxious that perfect success should be obtained at any cost of time and patience. At first, after the matter was evacuated, the joint was a round shapeless mass; but gradually, so to speak, it softened down, the patella became recognisable, and the hollows about the articulation reappeared. From time to time the wounds were glanced at; but they seemed to remain very inactive. At length, however, the yellow-looking portions diminished to mere lines in the centre of the deepest portion of each wound; and then lint dipped in carbolic oil and covered with oil-silk, was applied daily, and, after a further interval, red lotion was employed to hasten cicatrisation. The original splint and swing had been dispensed with for nearly a couple of months in favor of a light steel back splint, carefully adapted to the thigh, in order to secure immobility of the joint. The patient called upon me a short time ago, nearly eighteen months after the operation. He was then in excellent health, and able to walk well, with no more lameness than resulted from the joint being almost anchylosed in a nearly straight position. He wears a light steel support, to prevent a slight tendency to backward displacement of the tibia, which still exists.

With regard to the first case, I have recorded it fully because I consider it well exemplifies the marvellous influence of the antiseptic treatment when minutely, thoroughly, and persistently carried out. I have constantly practised making free incisions into acutely inflamed and suppurating joints, and am well aware of the advantages to be derived from so doing; but that this can be accomplished without subsequent considerable and exhausting discharge, and with success in an old and enfeebled subject, is entirely beyond my experience under any other plan of treatment than that which was adopted.

The first case then, was an acute suppuration in the knee-joint of an old patient. The second was of a perfectly different nature, being a chronic suppuration in a young subject, and consequently of a more hopeful nature as regarded the patient's ultimate recovery. But here, too, I assert that under no other mode of treatment could a great abscess connected with the largest articulation in the body have been safely opened, and have finally closed up, without more than a daily escape of at the most, a drop or two of matter. Of course, after the abscess had consolidated, and nothing remained but two red granulating lines, the carbolic treatment having been discontinued and red lotion applied, then at once matter formed, as from a mere superficial sore. Indeed I should say that more true pus came from these superficial sores in a day, during the short period they took to cicatrise, than escaped from the wounds during the many weeks of carbolic treatment which succeeded the operation. At the time this case was treated, Professor Lister had not brought out the carbolic plaster, and the putty and oil were then in use; but it serves to show that, whatever the materials, and however employed, if the particular principles of the antiseptic method be rigidly adhered to, success may almost always be obtained.—*Lancet, July* 2, 1870, *p.* 6.

53.—THE ANTISEPTIC PRINCIPLE IN SURGERY.

By the Editor of the LANCET.

A letter of Dr. Saxtorph, Professor of Clynical Surgery in the University of Copenhagen, published in the *Lancet* on the 27th ult., as a part of Professor Lister's communication, again revives that most urgent of all surgical questions—the antiseptic use of carbolic acid. It is impossible that this question can rest where it is. The averments on the one side are so strong and remarkable, and the incredulity of leading English surgeons is so general, that some decisive steps should be taken to come to a scientific decision. If we had a Royal Society of Medicine, the question would be

well worthy the consideration of a specially appointed committee. In the meantime we can only receive evidence. And the evidence of Professor Saxtorph is explicit, and equals in physiological interest anything published by Professor Lister, unless, indeed, it be the incorporation with a ligatured vessel of the catgut ligature made antiseptic with carbolic acid. Professor Saxtorph reports the abolition of pyæmia from his wards in the last twelve month, and says the result is certainly owing to the introduction of the antiseptic treatment, which he had seen practised by Professor Lister at Glasgow. It may be objected that this result is accidental. This cannot be said of other results obtained by the Professor. He details a case in which he had to open the knee-joint by a large incision, and had then much difficulty in extracting from it what proved to be a part of the head of the tibia. The operation lasted a quarter of an hour. The fingers, forceps, and different hooks had to be used. *But the wound closed without any suppuration of the joint.* This is attributed to the treatment, and such an uncommon result is not easily explained apart from the exceptional treatment which is thus described by Professor Saxtorph:—"During the whole time I poured a stream of carbolic solution over the wound;" after the operation, "I treated antiseptically." He does not say how many compound fractures he has had, but some of them have been very severe. He has treated them all antiseptically. And they have all *healed without the least suppuration in the fracture itself*, and the consolidation did not take much longer time than in a simple fracture. *All the amputations have recovered.* There has never been profuse suppuration, and never any putrefaction. These are certainly splendid results. The abolition of pyæmia in wards in which there were cases every year, the rough handling of a knee-joint for a quarter of an hour without any suppuration; and the prevention of suppuration in compound fractures, are effects which must be explained, and which seem to have their explanation in the use of carbolic acid as recommended by Professor Lister. The abolition of pyæmia, the prevention of the process of suppuration in cases in which hitherto it has been considered inevitable, and the entire prevention of putrefaction, are all very congruous and consistent results of the same principle of treatment. Professor Saxtorph endorses all that Professor Lister has said about the necessity of minute care. "Unless you take the greatest precautions in *every* dressing till the wound is either healed or filled up with granulations, you will never see the excellent results of this treatment." This explains failure to almost any extent. Professor Lister says that only faith in the germ theory will procure a thorough trial of the practice. Whatever becomes of the germ theory, the results obtained by Lister, Saxtorph, and others are new facts in surgery, or rather physiology, and must have a scientific definition.—*Lancet, Sept.* 17, 1870, *p.* 411.

54.—THE SUCCESS OF THE ANTISEPTIC TREATMENT OF WOUNDS EXPLAINED WITHOUT REFERENCE TO GERMS.

By Dr. R. T. Manson, Witton-le-Wear, Durham.

Having adopted and found good reasons for continuing to use what is known as Professor Lister's treatment of wounds, I may go on to state that I entertain serious doubts as to the soundness of the theory upon which it is based. These doubts arose from some cases of wounds in which the "germs" had full access for some time, in which no germicide was used to the surface of the wound, and yet in which no pus was formed.

It is difficut to resist the conviction that the ubiquitous impalpable germ, as difficult to capture as the fairies of old, has, like the "good folks," been debited with much mischief of which it is innocent. Professor Lister's theory is so well known that it is unnecessary to recapitulate it. The theory which I propose is, that the success of Professor Lister's treatment is *due* to the carbolic acid producing on the surface of a wound a stratum of

coagulum which protects the germinal cells below from the deleterious action of the oxygen of the atmosphere, just as the epidermis protects the true skin; and, secondly, to the production of an atmosphere or retention of an atmosphere of carbonic acid in and round the wound.

Whether pus-corpuscles be the descendants of nuclear cells or parasites within them, it is known that pus results from an abnormal growth of germinal or nuclear cell-material—that some obstacle to abnormal growth has been removed, and an increased access of pabulum allowed. In the case of a wound it is clear that the barrier, the scale armor of epithelium, is destroyed, and an increased supply of oxygen admitted. The result is the formation of pus. If this be so, it is evident that if we restore, to as great an extent as we can, the normal condition, we shall be doing the best we can as surgeons. This, I take it, we do by applying the carbolic acid lotion to the surface of a wound, Put a drop of albumen, say white of egg, on a glass slide, and beside it a drop of carbolic acid lotion; observe them under a microscope; let the two drops touch, and at the point and instant of junction a thin film, of what we may call "formed material," coats the albumen, and if the two drops are mixed a solid white mass of coagulated albumen forms on the slide; or, put a drop of saliva, containing epithelial cells, on the glass, and add solution of carbolic acid, the outline of the epithelial scale grows clearer, indicating the change produced. The carbolic lotion, then, changes the nuclear matter of each cell on the surface of the wound to which it is applied into an inert "formed material" protective of the vitalities below, as the epithelium does to what it covers. I need only point to the well-known fact that the degree of pus formation, and consequent pitting in small-pox, is in direct proportion to the exposure of the part to the action of the oxygen of the atmosphere, to show that such free access does not act injuriously.

The primitive surgery of our boyhood, when properties of great virtue were believed to exist in saliva, and when licking or spitting upon a slight excoriation or cut was understood to be a remedy of undoubted efficacy, may have been founded in school-boy instinct; but its value would be explicable on the same principle.

On the value of an atmosphere of carbonic acid to a wound (and such atmosphere must of necessity be induced by the exclusion of common air), I say no more than to point out that it is the normal atmosphere of all covered tissues, and that the old plan of healing wounds by scabbing is the ancestor of Professor Lister's treatment.—*British Medical Journal, Oct.* 15, 1870, *p.* 407.

55.—ON THE LOCAL APPLICATION OF SULPHURIC ACID IN THE TREATMENT OF CARIOUS AND NECROSED BONE.

By George Pollock, Esq., Surgeon to St. George's Hospital.

[There is nothing novel in the proposal to hasten the separation of dead or dying bone by the application of a strong mineral acid. Sulphuric acid, however does not appear to have been so generally appreciated as it deserves, nor are its effects sufficiently known.]

My attention was first drawn to the desirability of some such solvent as sulphuric acid in diseased bone, by a case of extensive necrosis of the bones of the skull, the result of congenital syphilis, in a young woman under twenty years of age. She had been the victim of this diseased action in the bones for some years. The discharge was most offensive. A large portion of the skull was exposed and dying; and portions were dead, but not loose. It was evident that a very long period must elapse before the whole of the diseased mass would be separated from the living, healthy bone, if the process of exfoliation was left to nature. I was averse to any instrumental interference for the removal of the diseased portions, from having witnessed untoward and even fatal consequences follow attempts to remove

dead bone from the skull by operation. It occurred to me, however, that if by the application of sulphuric acid to the exposed, dying, and dead bone, its solution or disintegration could be surely and gradually effected, much time might be saved, and the removal of the offensive mass be more quickly attained than if left to the slower work of time. I was led to the conclusion that if bone removed from the body could be rendered soluble or soft by the action of sulphuric acid, a similar result would as surely follow its application to dead bone in the living subject. I therefore determined to have recourse to the application of the acid as an experiment. The following are short notes of a few cases, among a large number in which the treatment has been adopted.

M. M., aged 19, admitted into St. George's Hospital in March, 1865, with a number of irregular ulcerations, very foul and sloughy, on the scalp and forehead, with much bone exposed and necrosed. The mother attributed the disease to the result of vaccination; but there could be no doubt that it was the result of congenital syphilis, and this conclusion was subsequently confirmed by the fact that one of the younger children became affected with disease of the bones of the palate. The patient was ordered large doses of iodide of potash, and the use of the mercurial vapour-bath, under which treatment the condition of the ulcerated portions of the face and scalp rapidly improved. The exposed bone was touched daily with a lotion of equal parts of strong sulphuric acid and water. This greatly accelerated the separation of the whole of the diseased bone; and she perfectly recovered without any portion of necrosed bone being allowed to exfoliate by its own natural process. The whole was entirely removed by the action of the acid; it crumbled away from day to day in minute fragments until all had disappeared. As the fragments became separated, so soon did healthy granulations fill up from beneath the space previously occupied by the bone. Although much disfigured by the extensive ulceration of the face, &c., the patient has remained perfectly well to the present date.

E. F., aged 15, admitted November, 1867, with a foul, unhealthy ulcer, about the size of the palm of her hand, on the front and middle part of the right tibia. The bone was black and rough to the extent of a crown piece. The disease originated in a strumous node three months prior to admission and had been a wound one month. She was ordered good diet, cod-liver oil, and quinine. On the 9th of December the bone was first touched with a lotion of equal parts of sulphuric acid and water, and this was daily repeated. On the 11th of February all dead bone was found to have been removed without any other operative interference, and the patient left the hospital on March 18th, with the ulcer nearly healed, and no dead bone to be felt in it.

H. G., aged 27, admitted January, 1867, while phagedæna was very prevalent both in and out of the hospital. On admission, there was a large, oval, ash-coloured ulcer on the front of the right leg, rather larger than a five-shilling piece. It was attacked several times by phagedæna, so that a large portion of bone was left exposed when the ulcer assumed a healthy character. To this exposed bone strong sulphuric acid was applied on the 1st of March, and by the 11th a large shell of bone had separated, leaving a healthy granulating sore beneath.

H. H., aged 50, was admitted August, 1869, with phagedænic ulcer, of syphilitic origin, on front of the leg. When the phagedæna had ceased, and the wound had become healthy, the tibia was left rough and exposed for more than the size of a crown piece. On August 9th the bone was touched with strong sulphuric acid, and on September 11th the greater portion had separated in a large thin flake, riddled with holes. He was discharged on October 1st, with the ulcer rapidly healing, the surface of bone covered with florid healthy granulations, and no exposed bone to be detected.

W. P., aged 36, was admitted September 1869, with a sinus over the *front of tibia*, leading down to the substance of the bone, where a portion

could be felt dead, but not loose. This was the result of a severe compound fracture of the leg some eighteen months previously. On September 16th the cavity in the tibia was laid open, and some portions of dead bone removed. The cavity, which was now fully exposed, was found to be lined by rough and carious bone. The cavity was ordered to be daily washed out with a lotion of sulphuric acid and water. The walls soon assumed a soft, healthy condition, becoming covered with granulations, and he left the hospital on November 3rd, the cavity nearly filled up, and no exposed bone to be felt.

It is not necessary to multiply instances; were it requisite, many other cases might be related. But the above are, I believe, sufficiently numerous and marked to illustrate the principles and results of the treatment advocated.

I am not aware that the application of sulphuric acid in the treatment of carious bone has been previously adopted in preference to the use of the gouge, actual cautery, or caustic potash; I find no especial reference made to its effects, nor any allusion to its extreme applicability and efficacy in the treatment of caries, in any of the modern treatises on bone.

In referring to the treatment of carious bone, Mr. Holmes says: "Often after free exposure of carious bone, the disease will gradually subside; but when this is not the case, the question occurs whether it will be proper to attempt to remove the carious surface and expose a more healthy one, either by rasping or gouging the bone, or by the application of the actual cautery, or to modify the diseased action by injections, or by applications to the carious part. The injections which are in use are composed either of iodine or dilute muriatic acid. The latter is intended to unite with the base of the phosphatic salts of the bone, and thus to remove its surface by disintegrating successive portions of it. It has been tried and strongly recommended by M. Chassaignac ('Mém. de la Société de Chirurgie,' vol. iv., p. 286), and no objection appears to exist to its employment in suitable cases; but I cannot say I have found much benefit from its use."

In speaking again of rasping, gouging, and actual cautery, he observes: "These operations should, however, only be performed in cases of evident necessity. We have only too frequent instances of danger of all operations on bones, especially of such as involve the exposure of large surfaces of the cancellous tissue, as is generally the case in these gouging or rasping proceedings, which are extremely apt to be followed by diffuse inflammation of the interior of the bones, osteo-myelitis, and by pyæmia."

In the number of cases which have now come under my notice, both in St. George's Hospital and in private practice, in no one instance have evil consequences been known to follow the application of sulphuric acid to diseased bone of any part of the body; nor has the treatment been found a painful one, when the acid has been used in a diluted form. If pain should follow the application, it usually lasts but a short period; for the acid in contact with the bone soon becomes neutralised, and ceases to occasion uneasiness. When diluted, the acid does not usually affect the soft tissues, even to the extent of uneasiness; nor does it produce the slightest subsequent irritation in them. The acid may be used pure, as in some of the instances quoted. Its application had better then be confined to caries or necrosis of the bones of the trunk when exposed or easily got at; and when it is desirable to destroy dying bone rapidly, or quickly to get rid of dead bone. The results of its application under such circumstances are very satisfactory. But for most other purposes, a mixture of acid with water, in equal parts, will be found sufficiently active and efficacious; and, for the removal of dead bone from the skull, I prefer it should not be used stronger, otherwise it might irritate the dura mater, should the lotion come in contact with it while being applied to the bone; for, in many of such cases, portions of the skull may already have exfoliated or been removed.

If employed for the destruction of carious surfaces in cavities of bones, or deep-seated carious patches on the surface of flat bones—e.g., the

pelvis—it will be found very convenient to apply the diluted acid with lint, and either to stuff the cavity with the wetted lint or lay the lint on the diseased patch; or the lotion may be used daily with a syringe. The former is, however, the preferable method of applying the acid, as its contact with the diseased surface of bone is most effectually ensured, and for a longer period than if the cavity be merely syringed out with the lotion.

On the second or third day, when the lint should be taken out, the cavity in the bone will be seen lined with an opaque white layer of tissue. In a day or two more this may be removed with a pair of forceps; it will peel off the surface of the deeper bone in the form of a more or less thick layer of tissue; it is, in fact, a soft slough from the surface of the bone, from which the phosphate and carbonate of lime have been largely if not entirely dissolved out. If on its removal there be still detected any rough surface of bone, the application of the acid should be repeated, and so often as any portion of exposed rough or carious bone is to be detected. Usually, as soon as one or two layers of slough have separated, healthy granulations commence to spring up from the surface of the bone beneath, and rapidly cover the living bone with a red velvety vascular tissue, which, growing daily, soon fills up the cavity, and closes the wound in the bone.

When the acid is applied daily with a glass brush, or rod, to a necrosed portion of exposed bone, the latter will be seen to disintegrate and crumble away in very small, dry fragments, or may be picked off in minute pieces like friable mortar; or a thin layer may be scraped off in a moist condition, if the attempt is made soon after the application of the acid, and while the surface of the bone is still wet. While the process of disintegration is taking place, and the bone is becoming more porous and perforated with numerous holes, healthy and abundant granulations are forming beneath, and may often be seen sprouting up in these apertures; so that as soon as any portions of bone are removed, or become detached, so soon is the part thus exposed seen covered by this healthy formation of granulations, ready to remedy and close the defect in the bone, and to assist in healing the external wound.

In cases of exposed bone of the skull I have always preferred the daily application of the dilute acid, rather than run any risk of too great and rapid an action by the use of the pure acid. Nor have I hesitated to use the lotion to the bone even when the pulsation of the brain through the exposed dura mater could be distinctly observed close to the edge of the necrosed portion. I have never in any single instance seen the slightest ill effects from the application of sulphuric acid to diseased bone. The more frequently I have used it the more satisfied I have been that it is one of the most valuable agents the surgeon has at his command to assist in the removal of dead bone and to set up healthy action in carious cavities or ulcerated surfaces of the long bones: valuable not only as perfectly safe when compared with the results of instrumental interference, but also expeditious when compared with the unaided efforts of nature. "The formation of the groove between the dead and the living bone is a very slow process in the bones of the limbs, requiring generally many months for its completion." But by the application of the acid this period in many cases may be reduced to a few weeks, if care and attention be given to the treatment.

Dr. Fitzgerald, of Dublin, has advocated and successfully employed caustic potash in the treatment of carious bone; and there can be no doubt of its advantages over the slow process of time, for it rapidly destroys the diseased portion, ensures its more early separation, and a healthy granulating surface subsequently. But when tested by the side of sulphuric acid it appears to lack one essential possessed by the latter—viz., the acid does not affect or injure the soft tissues when used in the diluted form, although at the same time it acts chemically on the *diseased bone alone;* it does not affect the living bone, and its application is seldom followed by any great degree of pain.

That, in the diluted form, it will only act on dead or diseased bone, and

not on healthy bone, is a point of very considerable practical importance; and is the great advantage sulphuric acid possesses as an application, under the circumstances quoted, over the use of the gouge, or of the actual cautery, or of caustic potash. The following experiments, conducted at my request by Mr. Henry M. Noad, lately my clinical clerk, satisfactorily prove the correctness of this statement.

Portions of dead, diseased, and healthy bone were selected and subjected to the action of sulphuric acid—viz.:—

1. Dead bone: 10 grains.
2. Diseased bone: 10 grains.
3. Healthy bone; middle age: 10 grains.
4. Healthy bone; old age: 10 grains.

Exposed to the action of a mixture of sulphuric acid and water, one part in four, for three days, at a temperature of 100°, the following were the results:—

1. Dead bone: phosphate of lime, 2 gr.; carbonate of lime, 3·30 gr.; dissolved in the mixture.
2. Diseased bone: Phosphate of lime, 2 gr.; carbonate of lime, 1·3 gr.; dissolved in the mixture.

3 and 4. In both specimens of healthy bone, *no action took place.*

The process of disintegration or dissolution, with the commencement of healthy granulation from the surface of the living bone, may be observed simultaneously progressing, in any exposed surface of dead or dying bone to which the acid may have been applied. When its action and effects are compared with those of the gouge, the bruising which is necessarily produced by the use of the latter, the pain and frequent subsequent inflammation, and, even under the most favourable circumstances, the time required for the rough lacerated surface to recover itself, throw off its small bruised fragments, and become covered with granulations, the treatment by sulphuric acid will be found far preferable.

"Hitherto," says Mr. Holmes, "we have been considering the usual method of separation; and, as this is a long and tedious process, seldom completed under many months in the case of a large sequestrum, and often dating by years, it is not surprising that efforts should have been constantly made to anticipate the period of cure by accelerating the separation of the diseased bone. These, however, have resulted in disappointment. The process must be left to find its natural completion in the spontaneous separation of the dead bone from the living; and any attempt to effect this by art—*i.e.*, to detach the necrosed portion and to cut it away from the living parts—only extends the area of the disease and endangers the preservation of the limb. Special considerations applicable to some regions of the body, such as the skull, may indeed induce a surgeon to operate on necrosed bone before it is loose, for the relief of matter pent up below it. Such operations, however, are not undertaken with a view of curing the diseased bone, but of restoring the functions of organs secondarily affected."

It must not, however, be considered, from what has already been said about the application of sulphuric acid, that it is intended to convey an idea that instrumental interference in the treatment of necrosis or caries will be no longer necessary. This is far from my object. Numerous will be the instances in which the surgeon must mechanically interfere for the removal of necrosed bone or for the exposure of carious cavities. The real merits of the treatment lie in the limitation of the action of the acid to the diseased bone, in the perfect safety of the application, and in the fact that it produces no irritation in the soft parts. The limitation of the action of the acid may be considered proved by the experiments recorded; its safety is especially exemplified when applied to diseased bone of the skull, and where it is most desirable not to interfere with instruments; and its benefical effects will be observed when applied to carious surfaces or necrosis in the long or short bones. It will also be found especially useful in the treatment of necrosis of the jaw, not only from the fact that it

hastens the removal of the dead bone, but, from its antiseptic qualities, it greatly modifies the abominable fetor which infects the breath of patients afflicted with this malady.

The application of the acid in diseases of the bones of the skull renders unnecessary all force or violence in a very critical condition of parts, and in which very slight local disturbance may be followed by severe consequences. The application of the acid in caries or necrosis of the long or short bones will often save the employment of the gouge, and consequently all bruising of the living surface of the bone. The surgeon with the gouge will cut away dead and living bone; he cannot to a nicety determine the depth of the carious layer. The acid disintegrates only the dead or dying surface, and appears to stimulate the healthy bone to a condition which enables it to assist rapidly in its own reparation. The application of the acid may therefore be frequently requisite without any operative interference; it will also be constantly advantageous after the use of instruments in the treatment of diseased bone.

The antiseptic qualities of the acid are no small recommendation to its use. The foul and offensive discharges so constantly accompanying diseased bone become at once altered in character by it, and in a short time all disagreeable smell usually ceases.—*Lancet, May* 28, 1870, *p.* 762.

56.—SULPHURIC ACID IN THE TREATMENT OF CARIOUS AND NECROSED BONE.

By Frederick Kirkpatrick, Esq., Dublin.

[This short paper was elicited by the preceeding article by Mr. G. Pollock, in which its author is alluded to as "Dr. Fitzgerald." Mr. Pollock had misunderstood his ideas as to the use of potassa fusa as an application to diseased bone.]

The caustic which I have recommended, and which I have used for so many years with such success, is the potassa cum calce. I have had it made in longer and thicker sticks than as usually supplied to the profession, and I employ it not only in the advanced stages of carious and necrosed bone, so well described by Mr. Pollock, but for the still more important purpose of cutting short the first stage of disease in bone, or that of acute osteitis.

No good surgeon hesitates to cut down and divide fasciæ, sheath of tendon, or periosteum wherever there is acute pain and deep-seated inflammation; but inflammation of the interior structure of a bone is, in general, allowed to go on for months or years until softening of its structure, abscess, and the other well-known disastrous effects are produced.

For several years I have promptly interfered in all such cases by cutting down and inserting a caustic tunnel into the spongy tissue of the distended and inflamed bone. In operating I use the knife and a pointed piece of the caustic alternately, first cutting, but not deeply, then using the caustic with some pressure or force, and so alternately until the bone is reached, when a trocar, auger, gimlet, or drill is used to penetrate through the compact tissue; the caustic is then again introduced to the bottom of the opening made into the cancellous structure. Prompt relief follows, and a thin, reddish serum continues to flow from the opening until a healthy suppuration takes place.

In this manner I have perforated the great trochanter in 13 cases of morbus coxæ; three of the patients are at present to be seen in the hospital of the North Dublin Union, and the others were exhibited to one or more of the hospital surgeons of Dublin.

This system of bloodless surgery by the alternate use of the knife and the potassa cum calce I have found of the greatest advantage for getting through the thickened and vascular structures over necrosed and carious

bone, in dividing the contracting bands resulting from deep burns, also for the destruction of epithelial cancer and other morbid growths.

As considerable pain is produced, chloroform should always be used, except in the case of the smaller articulations, when the ether spray may be substituted.—*Lancet, July* 9, 1870, *p.* 71.

57.—ON THE TREATMENT OF GANGLIONS.

By Frederic C. Skey, Esq., C.B., F.R.S., Consulting Surgeon to St. Bartholomew's Hospital.

[These little cysts, which occur on one or other of the numerous tendons at the back of the wrist are often treated in a rough fashion by rupture with a blow from the back of a book. This plan is however very unsatisfactory. The following plan rarely fails to effect an early, if not an immediate, cure.

The object is to evacuate the *entire* contents of the cyst, and to bring its opposite surfaces into perfect apposition with each other. It is a small operation; but on the delicacy of its performance its success materially depends. Bending the hand forwards, in order to tighten the skin over the cyst, pass vertically into the centre of the tumour a broad-shouldered lancet. By a lateral movement of the instrument the orifice will be dilated, and the contents will freely escape. Now it is indispensable to the obliteration of the cyst that the whole of its contents should be evacuated—every drop and every fraction of a drop, to effect which the sac must be compressed and kneaded in every direction. Then apply a well-made thick compress of lint, and strap it down tightly with good plaster, and, lastly, a roller may be applied. In forty-eight hours the wound has healed, and the ganglion is seen no more.

In cases (and I suppose I have operated on a hundred) in which the operation I have described failed to cure the disease, the ganglion, as it will do when of long standing, had burrowed under the tendon. In one of these I attempted to dissect it out; but, in so doing, I denuded the tendon of its natural investment, and the result was permanent union between the tendon and the integument. I never recall the circumstances of this case, and it occurred upwards of twenty years ago, without painful regret. The larger examples of a similar affection to the above—in which the synovial sac, propably the anterior one, which extends beneath the anterior carpal ligament into the palm of the hand, is the seat, and from which abundance of small melon-pip like bodies are obtained—may be treated on the same principle. But the subsequent pressure must be great.—*Lancet, Aug.* 27, 1870, *p.* 285.

58.—THE TREATMENT OF HOUSEMAID'S KNEE.

By Charles Robert Thompson, Esq., Westerham.

I believe that the treatment of inflamed bursa patellæ by the plaster of ammoniacum and mercury is not so generally known and accepted as it deserves to be. The following cases are selected from several in which I have used it with success, and require no comment.

Case 1.—June 20th, 1867, E. J., a young carpenter, came to me with a very largely distended bursa over the left patella, as large as half a cricket-ball. It had been so about ten days, with not much pain or inflammatory symptoms. I had it covered at once with the plaster spread on leather. On July 5th, there was great improvement. The hot weather made a fresh plaster necessary. On the 12th, the swelling was entirely absorbed. He had continued to work throughout, and was now cured.

Case 2.—S. S., a laborer, came to me on November 10th, 1869, with the bursa patellæ acutely inflamed. There were great pain, numbness, and heat.

I sent him to bed, and had constant hot fomentations applied for two days to subdue the acute symptoms. On the 12th, the plaster was applied. On the 16th, he was covered with erythema the irritation commencing and spreading from the plaster. A cooling saline draught was ordered. On the 23rd, he walked four miles to see me. The knee was quite cured.

Case 3.—On July 18th, 1868, a housemaid awoke in the night with acute pain at the knee. I found great pain, heat, and tenderness over the patella. The bursa was much swollen. She was feverish and ill, and was ordered to remain in bed and keep the knee covered with spirit lotion. On the 23rd, the acute symptoms had subsided. The bursa was very distended with fluid. The plaster was applied. On the 30th, the swelling was entirely absorbed. She was at work again.

Case 4.—On January 18th, 1870, W. M., a carpenter, came to me with a large inflamed bursa over the left patella. It was painful in walking, and had kept him awake for two or three nights. There was tenderness on pressure. The plaster was applied. On the 27th, I found the fluid almost absorbed; and on February 3d he was quite cured.

Case 5.—Mrs. C., a coachman's wife, accustomed to scrub a brick floor, consulted me on May 28th, 1870, with great enlargement of the bursa patella, which was also painful and tender. After one night's thorough fomentation, she applied the plaster. On June 4th, there was great improvement; and on the 18th she was cured.

Case 6.—On July 9th, 1870, Mr. L., an old farmer, a very religious dissenter, and as he said, "pretty often on his knees," came to me with great enlargement of the bursa patella, communicating with a large bursa over the head of the tibia, forming a large double swelling. He found great difficulty in moving about, but had not much pain or tenderness. The plaster was applied at once. On the 16th, the swelling was rapidly diminishing; and on the 21st he was almost cured, and did not attend again.—*British Medical Journal, October* 15,1870, *p.* 411.

59.—ON ABSCESS IN DIFFERENT LOCALITIES.

By Frederic C. Skey, Esq., C.B., F.R.S., Consulting Surgeon to St. Bartholomew's Hospital.

There is no disease more universal than abscess, and none that demands from the surgeon clearer pathologic views, and the consideration of which will afford you material for much profitable reflection. It is scarcely necessary to define an abscess. It is a collection of pus, contained in a sac or cyst. It may be preceded in its formation by a deposit of solid lymph, greater or less in magnitude; or an abscess may form without previous indication of its existence. Such examples are not infrequently found under the skin, and in various parts of the frame, following diseases which exert an unusually depressing influence on the system—such as fever, dysentery, phthisis, &c. This latter variety is invariably the product of extreme debility. Now, is this purulent deposit in the tissues of the body the result, as is too often supposed, of real inflammation—that is, of an active hyperæmia—or not? Assuredly it is not. It is associated with, and, more than that, it is the product of a weak condition of the arterial system, and necessarily of all the vital powers. You will find the pulse, when the disease is extensive, weak; for, even if full and large in calibre, it is readily compressed. I wish you especially to recognise this feature in the formation and progress of simple abscess; the indications of weakness being of course, greater when the abscess is large. The greater the debility the larger the abscess, and the slower its progress towards both maturity and recovery.

You will naturally infer, then, that all abscesses occurring spontaneously, or rather without external and obvious causes, demand treatment by tonics and stimulants, and of such I select especially bark and wine. There is no remedy in the Pharmacopœia so potent in producing suppurative action as *bark, and of* all forms the simple tincture is the most efficient, in full doses

of two or three drachms diluted with water. By the term suppurative action, I understand the conversion or breaking down of a mass of lymph, itself quite incapable of removal by the absorbents, into fluid pus—in fact, into abscess.

There is no form of abscess more illustrative of these truths than the disease when situated on the mammary gland, on which I have so often spoken in this theatre. It appears in weakly constitutions, following long and severe confinements, with loss of blood, or a low and innutritious diet, erroneously supposed to act as a preventative to inflammation, which, in truth, it actually fosters.

I speak of common *mammary abscess* which appears at varying periods after confinement, in its first stage of deposit of lymph, when occupying a greater or less portion of the entire gland. Now let me assure you that we have no means within the circle of our present knowledge of obtaining the absorption of this solid mass or throwing it back on the constitution. Neither iodine, nor leeches, nor fomentations nor purgatives, or other supposed remedies confidently proposed by young medical men, who, unfortunately, observe little and think less, are at all available to good. Yet you are aware that they are the agents which two-thirds of you at least would resort to. I am sure of this, for I am told so at every College examination. Pray understand the absolute impossibility of getting rid of this once deposited mass by the means alluded to, and you are all prepared to adopt. I will not go so far as to say it may not be at least partially dissipated by absorption, but not by your means.

The proportion of the deposit that may be absorbed depends on the stage it has arrived at. If much advanced it will pass on almost entirely into suppuration. It has already entered on that of suppurative action; it will not remain stationary, and it must advance; but whether its progress towards its necessary consummation be slow or rapid, depends on your treatment. I say, in all abscess give bark freely, and generally wine; and the larger quantity of each that your patient can bear, the earlier will this solid mass break down in the centre and form a large abscess, which when matured, and not before, should be freely laid open with the knife. If the deposit be recent, and the disease treated early on this sound principle, a portion of the mass will be taken up by the absorbents, indicated by the disproportionate quantity of pus to the large mass that has produced it.

Perineal abscess often presents itself in the form of a small rounded, hard tumour, by the side of the urethra in the perineum, of about the size of a marble. Whatever you may suppose, or have been told to the contrary, it will answer, in my opinion, no useful purpose to adopt, in this form, any other treatment except that I have recommended to you in the case of mammary abscess. I do not consider it at all necessary to the true pathology of this disease that it should be based on any lesion of the urethra. It is not necessarily, nor by any means invariably, the result of urine infiltrated into the cellular tissue. It results from irritation conveyed to this tissue by the use or abuse of instruments employed in the treatment of stricture, real or supposed. When pus is thoroughly formed—and it is a great object of treatment to attain this end as early as possible—do not open the canal of the urethra, if urine does not pass through the wound. Should it do so there would appear to be even less necessity for this extension of the incision.

It is not always an easy diagnosis to determine whether fluid about the *knee-joint* is within the cavity of the articulation or without it. As a general rule the diagnosis is readily attained in these cases. You will tell me that when the fluid extends over the patella, the disease consists of abscess around the joint; and when the patella is raised, and is pushed up by fluid underneath it, the collection is within the articulation. That is all very true. But in many cases the fluid, although confined to the joint, is not sufficient in quantity to raise the patella, and therefore you cannot always depend on that particular evidence; and in the other case, in which con-

sequent on the greater tenacity and closer adhesion of the integuments to the fibrous tissue upon the patella, I have seen several examples of what I have called the horse-shoe abscess around the knee—viz., when the matter has travelled round three sides of the patella without extending over it. Such cases are very deceptive. In forming your opinion—and a correct judgment is often indispensable to the recovery of your patient—you would, of course, place your greatest reliance on the local examination by the hand, and, this proving insufficient, weigh deliberately the evidence in favour of one or the other locality. If the fluid be in the joint, it may be a more serious affection, and the constitution takes cognisance of it as such. If external, probably the formation of abscess has been preceded by some local injury of a superficial kind, involving the cellular tissue, and in which the condition of the skin itself may add its testimony.

I now come to abscess on a larger scale. *Abdominal abscess* presents itself in the form of a large tumour, occupying the lower part of the abdominal walls, and commonly extending from the ilium towards the mesial line of the abdomen. The size is sometimes immense. It is firm, solid, and unyielding on pressure, but not very painful. I have known it on several occasions to be mistaken for malignant disease. It will remain stationary for a long period, and when it breaks down into pus, the fluid will extend in various directions, backwards towards the loins, almost invariably along the course of the femoral vessels to the extent of four to six inches; while it occasionally breaks its way through the sacro-ischiatic foramen, and forms an immense tumour on the gluteal region. This disease may be said to place life itself in jeopardy, not merely from its magnitude, but from the depressed condition of the system that produces it. In this feature it resembles carbuncle. I will tell you briefly some few particulars of the first case I ever saw. It occurred to a gentleman of advancing age, who first detected the disease while on a journey in Wales. He consulted a surgeon, who reported to his family that his disease was malignant. He consulted a second authority in the West of England, who echoed the opinion of the former gentleman, and advised his immediate return to London. I saw him in consultation with his friend, the late Dr. Rigby, on the day following. Other medical men were present. My reason for entertaining a doubt as to the malignant nature of the disease was based on the fact of its very recent appearance, which seemed to me fatal to the supposition of malignancy. I considered it a prospective abscess, and I gave him bark and good nourishing diet, with wine. In the course of ten days the swelling increased largely, and I thought I felt fluctuation. In the presence of several medical men, and in the confidence of my opinion, I punctured the tumor through the abdominal wall; nothing but blood followed the puncture! I then ordered brandy in place of wine, and turtle soup, a thoroughly animal diet. In four days I again punctured freely, and evacuated about eighteen ounces of healthy pus. He recovered in a month.

In March last I saw a gentleman, aged 75, with a large tumour in the abdomen, occupying the right side, and extending from the iliac fossa. I was told by the family medical attendant that his patient was the subject of malignant disease, and that he had been visited by two eminent physicians (and they were both men of deserved eminence), who had pronounced his case hopeless from this cause. With some difficulty, I convinced his medical attendant that the great probability was in favour of abscess; and with his concurrence, I gave him large doses of bark, and about a pint and a half of port wine daily. Within one week at least one-third of the abdomen was swollen and red, and the hand readily detected large fluctuation of pus, of which fact my colleague was as convinced as I was; but his family objected to an operation, and the poor gentleman carried his abscess to his grave. His attendant nurses were confined to the members of his family, and belonged to the amateur class. Such nursing is not very infrequently fatal to life.—*Lancet, July* 23, 1870. *p.* 111.

60.—IODINE AS A TOPICAL APPLICATION TO WOUNDS.

By Dr. James Stirton, Glasgow.

In December of 1869 I was compelled, owing to the failure of other methods of treatment, to try the injection of a strong tincture of iodine in a case of dropsy of the knee-joint, with a good and apparently permanent result. About the same time there came under my notice a case of fistula in ano (a highly strumous subject) which had recurred again and again, after thorough division by the knife, and with such aggravations that the patient's life was rendered miserable. At my wits' end I tried injections of iodine, after getting the system as well regulated as possible, with good results for a time; but a recurrence of the discharges with all the attendant painful symptoms, induced me to incise pretty freely in the usual way, and afterwards impact into the cut surface an ointment containing a large proportion of iodine. No disturbance of system ensued, but a rapid healing without union, and no return after an interval of four and a half months.

The next case wherein I used iodine was a scrofulous abscess in the groin. I injected a solution of two grains to the ounce of water, with the addition of a little iodide of potassium, every twelve hours for three days, when rapid contraction and healing ensued. Success in this case rendered me bold, and I now began to use iodine as a topical application to wounds of all sorts, including incised, and much in the same way as carbolic acid is used. I was astonished at the results. I still employed the solution containing two grains to the ounce of water. The first instance of this application was after excision of a small tumour. I confess it was with some fear and trembling I squirted the solution on the cut surface, but the glazed appearance immediately assumed, and the rapid healing by the first intention, both surprised and delighted me. At this stage I happily induced Mr. Wilson, of the Veterinary College here, to try the use of iodine on various animals, and with the same happy results in the great majority of instances. It is no uncommon request, now, on the part of grooms and others, to have the "brown bottle" to apply to abraded surfaces, &c. As there is every probability of his publishing a detail of his cases under this treatment, I forbear giving any from the horse.

I have not yet had sufficient experience to enable me to determine how strong a solution or ointment may be employed locally—of course, other solvents than water being employed—but the presumption is in favour of strong applications; at least no general disturbance of the system has hitherto ensued, while good results have been obtained in two or three almost desperate cases.

There are two or three considerations why iodine should hold as good a place as, if not better than, carbolic acid as a topical application.

1st. Its well-known action, in whatever part of the body, of determining just that degree of congestion (or call it what you will) of the surface which is attended with the production of such a degree of plastic lymph best suited for the adhesion of parts in contact.

2nd. The well-known destructive effect it has on all the living germs that float in the atmosphere, or are carried in water, such as the so-called monads, vibrios, &c. I mention this, as the germ theory of many of our acute diseases is now rampant. Query: Might not the application of iodine obviate to a great extent, at least, the spread of hospital gangrene?

3rd. Being one of the elements, or at least a very stable substance under any reaction whatever, it is not liable by contact to enter into any unknown and it may be, deleterious chemical compounds, with the living tissues, as carbolic acid may presumably do.

4th. As shown in one instance, at least, it has a wonderful power of separating dead or dying tissue from the living and active. I allude to the case of a carbuncle on myself, where I was gratified with the result.

I might, of course, enlarge considerably on this head, but as the subject

is purely speculative, I forbear, and conclude with the hope that others may find, under its action, as good results as I have done.

I may mention that phosphorus has similarly engaged my attention to a small extent, but as I am not in a position to pronounce definitely concerning its local action, I desist at present.—*Medical Times and Gazette, September* 3, 1870, *p.* 265.

61.—THE HEALING OF WOUNDS BY TRANSPLANTATION.

By Georgs Pollock, Esq., Surgeon to St. George's Hospital.

Pending the final results of Mr. George Pollock's experiments, which are now being carried on at St. George's Hospital, with a view to determine the possibility of considerably hastening the healing over of ulcerated surfaces, and especially such as result from severe burns, by the transplantation of healthy epidermis to the ulcerated surfaces, according to M. Reverdin's proposal, we think it will be interesting to our readers to give a general summary of the mode of operation, and the actual results of this new procedure in conservative surgery. On hearing of the experiments of M. Reverdin, Mr. Pollock determined to attempt to heal, by the transplantation of healthy skin into its midst, of an extensive ulcerated surface in the case of a child in St. George's Hospital, who had been severely burnt on the thigh, from hip to knee, some eighteen months previously, and whose case we have now carefully examined. The child in question is eight years old, and the ulcer on the outside of the limb is in general outline club-shaped, the smaller part being situated at the knee, and the larger portion above. The ulcer is nearly eighteen inches in length, and about twelve inches across at its widest part. The case, on admission, appeared almost hopeless, as far as permanent cicatrisation was concerned; the ulcerated surface had been in much the same state for months past, and would certainly have taken another year or two to heal, if it would have ever healed, under the usual form of treatment adopted in those cases. The healing process had advanced to about an inch and a half from the original margin of the burn from either edge. Two months ago, Mr. Pollock transplanted to the granulating surface of the ulcer, two pieces o the child's own skin, the size of millet-seeds, taken from the side, just above the ilium. An incision was made in the granulations, the piece of skin embedded therein at once, and then covered over by a piece of adhesive plaster. At the end of a week there was nothing to be seen of the transplanted skin, and to all appearance the experiment was an entire failure. At the end of a fortnight two small isolated spots of something like cicatrisation could be detected at the points where the skin had been embedded. These now began to increase in diameter more rapidly than one could have imagined or expected; so much so that at the end of five weeks they were quite conspicuous, like islands in a sea of granulations, and they were rapidly increasing in circumference. Mr. Pollock now transplanted three more pieces to the other portions of the ulcer. Two of these at the end of a fortnight were evidently commencing to send forth circular patches of cicatrisation, and they are now well marked, and daily increasing in size. The third portion has also taken, but did not make itself evident so early as the other two. On Sunday last, at our visit to the case, we observed that one of the original implantations has resulted in nine weeks in bridging completely across the lower part of the ulcer, near the knee. New skin in the form of a patch two inches by one and a half, and a second island of new skin two inches in diameter, had been produced, higher up, from the second of the original transplantations. One of the transplantations, performed five weeks since, had given rise to a third islet about the size of a shilling. The new portions of integuments are at present devoid of sensation to any foreign body or to touch. The *case promises* to do thoroughly well under the new surgical procedure,

which, if successful, must mark a new era in the treatment of extensive burns, by preventing the sad deformities and the long exhausting illness which so often follow them. Apart from the interesting practical considerations connected with these curious and remarkable results, there appears to be one point having a very important physiological bearing, and that is the nature of the new growth. How from so small a point of skin could such patches of cicatrisation or new structure and covering arise? And why should the process of healing be greater around the newly implanted skin than at the margins of the original ulcer? Was it the simple result of epithelial cell growth started by the implantation of a few healthy epithelial cells in a nidus congenial to their life, reproduction, and increase?

To endeavor to throw some light on this point, Mr. Pollock took advantage of a hint from Dr. W. Ogle—viz., to implant a minute portion of black skin at one point of the granulating surface, and observe whether cells containing pigment were propagated in a manner similar to that which followed the ingrafting of the white skin. There has not yet been sufficient time to test the results of this last experiment.

The portion of skin removed in each instance was about the size of a millet-seed; indeed, the success of the experiment seems to depend essentially on the minuteness of the piece transplanted. Mr. Pollock has further taken from his own arm a small piece of skin, and implanted it in a patch of the granulations, to test whether there will be any difference observable hereafter between the patches of skin transplanted from the child's own body and that taken from another person; and, by the way, this disposes of the question of cruelty, for the operator has not failed to deal precisely the same with himself as with others. Mr. Pollock has operated upon a second case, and, we hear, that he will continue the experiment on others.

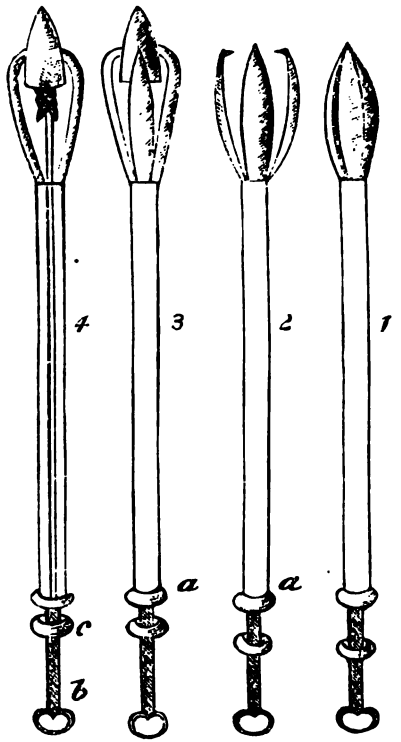
Of one thing there can be doubt in reference to Mr. Pollock's case, that, whereas the healing process had extended only a certain distance from the edge of the healthy skin: and whereas the closing up of the ulcerous surface must have taken place rather by contraction from both sides of the already-formed cicatricial tissue than the spreading formation over it of epithelial tissue, new centres whence large patches of new integument spread have been formed by the transplantations of skin practised by Mr. Pollock after the manner followed by M. Reverdin; and the result must be, if nothing hinders the repetition of the operation, that the wound must heal over in a much shorter time, and with much less suffering than usual, and without deformity consequent upon the free contraction of the cicatrix which would otherwise form.—*Lancet, July* 9, 1870, *p.* 62.

62.—DESCRIPTION OF A NEW BULLET EXTRACTOR.

By Surgeon T. E. Tuson, M.D., Bengal Medical Staff.

I am desirous to bring before the profession a bullet extractor invented by myself some years since, and which has not as yet, for want of opportunity, been fairly tried by army surgeons. A long experience in gunshot injuries inclined me to have an instrument made which would in its shape and conformation be similar to a probe, and combine in its mechanism prehensile powers to seize a bullet the moment its situation was felt by the surgeon. This instrument was therefore made in the shape of a probe with three blades at the end which shut completely, so that it might be introduced into a gunshot wound with perfect facility. I believe that most surgeons on the field of action have felt the difficulty of finding a bullet, and to have frequently experienced the annoyance after ascertaining its position, on searching for it with the pocket forceps now in general use to have found it had slipped away into adjacent cellular tissue or sheathing of a muscle. The blades of the instrument open or shut at the surgeon's discretion, and the moment the situation of the bullet is indicated by the sense of palpita-

tion, it can be seized by the operator. In addition to this a centre screw passes through the instrument, which on being revolved enters the bullet, and fixes it so firmly that it can be extracted, even if it be impacted in a bone. The screw cannot injure surrounding tissues, as it works between the blades of the forceps, in the hollow space produced by their convergence. I believe this instrument will be found useful in the present war, as it is portable and light. The forceps now used in our army cases are so inadequate for the purpose that I think an improvement on them will be considered a desideratum.



Description of the Drawing.

1. The instrument with the blades closed.
2. The blades of the forceps open by pulling back the shaft of the instrument A.
3. The blades of the instrument represented grasping the bullet by pushing forward shaft A.
4. The screws in centre of the shaft of the instrument represented entering the bullet. This is done by twisting round screws B C a small running screw button, to indicate the distance the screw passes through shaft of the instrument.

The bullet extractor is made by Mr. Pratt, Oxford Street.—*Medical Times and Gazette, Aug.* 6, 1870, *p.* 152.

63.—ON THE TREATMENT OF DISTENSION OF THE FRONTAL SINUS FROM PENT-UP SECRETION OR PUS, WITH TWO CASES, AND ILLUSTRATIONS.

By GEORGE LAWSON, Esq., Surgeon to the Royal London Ophthalmic Hospital, Moorfields, and Assistant Surgeon to the Middlesex Hospital.

[The deformity from displacement of the eye is so great in cases of this nature that an efficient plan of treatment is absolutely necessary. A communication is to be established between the interior of the cyst and the cavity of the nose, so that by continued drainage and the application of local astringents, the walls of the cyst may gradually contract.

A single curved incision parallel with the fold above the lid is to be made over the most prominent part of the tumor, and having by a little dissection exposed its surface, the scalpel should be plunged into it, and an opening made to the extent of the incision. The index finger of the right hand is now to be pushed into the sinus through the wound to ascertain the size of the cavity, and if there is any necrosed or carious bone. Whilst thus exploring the sinus, the little finger of the left hand should be passed up the corresponding nostril, and an endeavor made to find out the spot at which the tip of the finger in the sinus will approximate most closely to the end of the one in the nose. After a little search it will be found that at one part the fingers will almost meet, there being only a thin plate of bone between them. Having gained this information, the finger in the frontal sinus is to be withdrawn, but that in the nostril is to be retained *in situ* to act as a guide to the gouge or elevator, which is to be passed into the sinus and made to force a passage into the nose through the lamina of bone on which the tip of the little finger is resting. A communication between the frontal sinus and the nose having been thus established, an india-rubber drainage tube with holes cut at short distances is to be introduced, one extremity of which is to be afterwards fastened on the forehead, whilst the other end protrudes slightly from the nostril.

The easiest way of introducing the drainage tube is to pass a probe with an eye up the nostril and out of the wound, and having fastened the tube to it by means of a piece of string, to draw it back again through the nose.

The object of the drainage tube is to keep the channel between the two cavities from closing, and to enable the attendant to wash out the frontal sinus at least twice a day with some astringent and disinfectant solution.

Case 1.—John C., aged 58, came under my care at the Royal London Ophthalmic Hospital on March 12, 1869, on account of a large tumor at the inner side of the orbit.

The patient dates his present affection from a kick he received on the left eyebrow from a horse when four years old, fifty-four years ago. There is still remaining as the result of the injury a depression of the bone over the left eyebrow, and a scar on the inner side of the nose. The left eye is considerably displaced by the tumor; it is half an inch further from the nose, and nearly an inch lower down in the face than its fellow of the opposite side. The eye is projected outwards, and the patient is unable by any effort, to draw it inwards. The inner half of the field of vision is lost, but in the outer half he can count fingers, although he is unable to read any sized type. On the left side of the bridge of the nose there is a smooth, round, elastic swelling about the size of half a large walnut protruding from the inner side of the orbit. It varies in size, being much smaller when he gets up in the morning, and larger when he goes to bed at night. There is no pain in the tumor, nor in the scar of the old injury.

On the day of the patient's admission into the hospital I performed the operation I have described, and passed an india-rubber drainage tube through the distended sinus into the left cavity of the nose and out of the corresponding nostril. The contents of the cyst consisted solely of a thick dark glairy fluid, evidently the pent up accumulation of many years' secretion of the lining membrane of the frontal sinus. A very slight amount of

irritation followed this operation, and the patient in a few days expressed himself as greatly relieved of the sense of weight which had lately oppressed his brow. A free discharge drained through the tube, which was shifted twice a day, and previous to each shifting the cavity of the cyst was thoroughly cleansed with a solution of carbolic acid ♏ iv ad aquæ ʒ j, which was squirted into the sinus through the drainage tube.

Gradually the discharge diminished in quantity; and as the cyst walls contracted, the eye regained to a great extent its proper position within the orbit. The tube was worn for nearly eight months, when, as all discharge had ceased, it was withdrawn. After the removal of the drainage tube there was left a fistulous opening at the inner angle of the orbit, which may possibly require a slight operation to effect a permanent closure.

Case 2.—Alice S., aged 21, came under my care at the Ophthalmic Hospital, on April 6, 1869, on account of a tumor on the inner side of the orbit which projected the eye downwards and outwards.

The girl states that about six years ago she noticed a swelling at the inner side of the left orbit, close to the bridge of the nose; it was small and soft to the touch, and varied in size, being larger at one time than another; it gradually increased until it attained the dimensions shown in the drawing. The sight of the eye is good. She can read No. 1, with ease at 12 inches, and No. XX. Snellen at 20 feet. Her mother thinks that the swelling originated in a severe attack of erysipelas which she had when she was six years old. On two occasions the tumor has been punctured, and each time a thick fluid was evacuated.

After her admission into the hospital, I performed on this patient the same operation as in the preceding case, and succeeded in introducing a drainage tube through the distended sinus. After cutting into the tumor, my finger passed readily into a large cavity, the dilated frontal sinus, in which I detected a small portion of necrosed bone, which was, however, too firmly adherent to the living structure to be detached. The contents of the cyst consisted partly of the same dark glairy fluid as was found in the first patient, but partly also of pus, with which the dark fluid was freely streaked. It is very probable that through the free channel now established between the frontal sinus and the nose the portion of necrosed bone will escape after it has become detached.

The after-treatment consisted in daily shifting the tube, and in washing out the cyst at first with a solution of carbolic acid ♏ iv ad aquæ ʒ j; and and afterwards with a lotion of glycerini acidi tannici ʒ j., ad aquæ ʒ viij. The patient progressed most satisfactorily, and after a few weeks returned to her home, where she continued to wear the tube for nearly six months. The last account I received from her was accompanied with a photograph, which was taken just before the tube was withdrawn. She was much improved in appearance, and the eye had returned to its proper level within the orbit. *Practitioner, July* 1870, *p.* 8.

ORGANS OF CIRCULATION.

64.—UPON ARREST OF ARTERIAL CIRCULATION IN A LIMB BY MEANS OF OVER-FLEXION.

By Dr. George Y. Heath, Surgeon to the Newcastle Infirmary.

[The following is a part of the address in surgery delivered at the annual meeting of the British Medical Association at Newcastle last year.]

The power exerted by the bent position of a limb, or overflexion, upon the blood-stream, first came under my notice a good many years ago in this way. In the year 1848 or 1849, a travelling jeweller, who had a booth at one of the periodical fairs in this town, having occasion to get up in the night, struck his leg, whilst walking across his booth, against the sharp, projecting end of the broken top of one of his jewel cases. He fell to the

ground in a fainting state; and Mr. Featherstonhaugh, a surgeon here, was hurriedly sent for to see him. Mr. Featherstonhaugh found a punctured wound high up in the leg, passing deeply between the bones, and bleeding furiously; being alone in the middle of the night, and without instruments, no operation could be attempted; and he endeavored to stay the bleeding by plugging. This was utterly impossible; in spite of his efforts, the blood continued to well up from the wound like water from a spring. Mr. Featherstonhaugh was at a loss for a time what course to pursue, when it occurred to him to bend the leg forcibly upon the thigh; the flow of blood was at once slacked, and pressure by pads now easily arrested the hemorrhage. The bent position was not kept up in this case, and bleeding recurred, on account of which I saw the man with Mr. Featherstonhaugh; and ultimately the anterior tibial was ligatured at the wound, and a piece of broken glass removed from the interosseous membrane. This case was reported in the *Lancet* at the time, and was quoted by Mr. Guthrie in his lectures at the College of Surgeons, as a good example of his own principle of treating wounded arteries. The point in the case, however, which I now wish to notice, is the marvellous effect produced by bending the knee. This effect was never forgotten by me; and since that time, but more particularly of late years, I have frequently had recourse to this expedient to stay arterial bleeding, sometimes temporarily, often permanently. For some time I hesitated to trust to this proceeding alone. Latterly, however, I have frequently done so, and have treated wounds of all the vessels of the forearm; of the radial, in the middle of its course, and near its termination, between the metacarpal bone of the thumb and that of the forefinger; of the ulnar and its upper third; of the superficialis volæ and the palmar arch, by flexion of the elbow. I have not had such frequent opportunities of testing this means in the lower extremity, but have employed it occasionally to restrain secondary bleeding from stumps, with marked success, and also in a case of malignant disease in the lower third of the tibia, where profuse hemorrhage followed an exploratory incision.

A French surgeon has recently impugned the efficacy of flexion as a blood-stopping means. I have therefore had some experiments done at the Infirmary here, with a view to test the effect of this position upon the pulse at the wrist, and at the ankle.

These experiments were done at different times, and on several different individuals, by Dr. Page, our excellent house-surgeon; and by myself separately, with the assistance of Mr. Kaye, my dresser, with the following results:—

A. *Upper Extremity.*—1. Forearm bent on arm by muscular action of the individual experimented on. In persons with considerable muscular development, pulse at the wrist entirely stopped.

2. Forearm bent on arm simply, with the hand flat on the shoulder. Pulse weak and indistinct, sometimes, but rarely, quite stopped.

3. Forearm bent on arm, with hand pronated. Pulse more weakened, sometimes stopped.

4. Forearm bent on arm, hand pronated and extended. Pulse usually quite stopped.

5. Forearm bent on arm, hand pronated, and bent at wrist. Pulse either almost imperceptible or quite stopped.

6. Forearm bent on arm, with a roll of lint or cambric pocket-handkerchief rolled up and laid in bend of elbow. Pulse always entirely stopped.

B. *Lower Extremity.*—1. Leg flexed on thigh. Pulse in posterior tibial artery much weakened.

2. Leg flexed on thigh, and thigh on abdomen. Pulse in posterior tibial stopped altogether almost invariably.

3. Leg flexed on thigh, with a roll of lint or cambric pocket-handkerchief laid in the bend of the knee. Pulse stopped in some cases, not always; but with flexion of thigh on abdomen also, pulse invariably stopped.

4. Thigh flexed on abdomen, the trunk bent forward. Pulse materially weakened.

From these experiments, as well as from those cases of actual bleeding in which this method has been used, it may be fairly inferred that we possess, in over-flexion, a blood-controlling agent of considerable power, which can be applied on the shortest notice, which requires neither instruments nor apparatus other than can be obtained in the poorest cottage; which can be put in force by any one possessing neither special knowledge nor operative skill; which is not dangerous in itself; and which may be relied upon with certainty to restrain bleeding, at least temporarily, even when it may fail permanently to arrest it. The bleeding from a wounded artery is so striking a thing—so many circumstances concur to attract the eye and arrest the attention—the crimson blood flying in jets across the room, or welling from the wound; the death-like aspect of the bleeding man—his livid pallor and convulsive agitation; these are so appalling; the absolute danger is so great and imminent, that we do not wonder if the ordinary bystander is palsied by affright, and the surgeon himself deeply impressed by the gravity of the situation. It is to such a scene that suddenly, and without preparation, he may be summoned, perhaps to some remote place, it may be in the middle of the night. Without assistants, except the terror-stricken spectators, who encumber the room, by the flickering light of a candle, a practised operator might hesitate to undertake the search after the wounded vessel. If, then, at such a time the mere flexion of a joint will remove the danger, allay the tumultuous excitement, dissipate the apprehension and anxiety, and relieve the surgeon from an embarrassing and perhaps doubtful operation, were it only temporarily, it is surely a valuable addition to our resources.

But when I find that in the upper extremity over-flexion may be relied upon as a permanently efficacious measure, enabling us, in wounds of the palmar arch for instance, to avoid a tedious and perhaps mischievous dissection in the palm, or the ligature of all the arteries of the fore-arm or of the brachial; when I recall to mind the controversies which have prevailed as to the best treatment of repeated and secondary hemorrhages; the choice offered to us between a tedious, difficult, and uncertain dissection in the midst of an ill-conditioned wound, or among a huge collection of clots, in search of the bleeding orifices, and a serious operation to ligature the trunk, in the lower extremity at least—an uncertain, not always effectual and sometimes dangerous, proceeding; when I read in the most recent systematic works on surgery, that secondary hemorrhage from the deep arteries of the leg is a sufficient reason for amputation, and remember that have myself seen a person narrowly escape amputation of the hand in consequence of wound of the palmar arch, I cannot but think I am justified in offering to your consideration this method as an illustration of conservatism in surgery. If you consider this account tedious and unnecessarily long, I must express my regret; but as this mode of staying the flow of blood from bleeding arteries is only just mentioned in the last edition of Mr. Erichsen's *Science and Art of Surgery*, and not even alluded to in Mr. Holmes's, the most complete and popular systematic works on surgery of the day, it seems that some account of my own experience of the effects of position might not be altogether uninteresting.—*British Medical Journal*, *Aug.* 13, 1870, *p.* 165.

65.—ON THE TREATMENT OF INTRA-THORACIC ANEURISM BY THE DISTAL LIGATURE.

By CHRISTOPHER HEATH, Esq., Assistant-Surgeon to University College Hospital.

The patient, Julia W., upon whom I tied the right subclavian and common carotid arteries simultaneously in the Westminster Hospital on November 21st, 1865, (*vide* Lancet, Dec. 2nd, 1865, and Jan. 5th, 1867,) died on December 8th, 1869, from the external bursting of an aortic *aneurism*. By the patient's own wish, I was able to have her body

removed to the Royal College of Surgeons, where it was carefully injected from the abdominal aorta, and afterwards dissected by Mr. Moseley; and the preparation will be added to the college museum.

The condition of the patient at the time of the operation was as follows:—There was a pulsating tumour at the inner end of the right clavicle, which was thrust forward. The interclavicular notch, which was obscured by the tumour, could be felt on making deep pressure with the finger. The pulsation extended above the clavicle and slightly towards the sternomastoid muscle. When first seen there was no bruit, but subsequently a faint bruit could be heard. The patient was pale, but well nourished; she suffered considerable pain in the tumour at intervals, was unable to assume the horizontal position without distress and dyspnœa, and had some difficulty in swallowing. The right radial pulse was smaller than the left.

The patient was examined by numerous physicians and surgeons of eminence, and the almost unanimous opinion was that the aneurism affected the innominate artery, though there was some difference as to whether or not the aorta was slightly involved in addition. In the week during which the patient was in the hospital under observation the tumour decidedly increased, the pressure symptoms became aggravated, and pain with numbness in the right arm, came on. Under these circumstances, and believing the aneurism to be one of the innominate artery, I tied the right subclavian artery outside the scalenus, and the right common carotid artery above the omohyoid muscle, on November 21st, 1865.

In determining upon tying the two main arteries simultaneously in this case, I was influenced very considerably by the arguments employed by Mr. Erichsen in his work on Surgery, wherein he shows that obliteration of *one* of the main trunks, whether by disease or ligature, has never been sufficient to effect the cure of aneurism—except, indeed in Mr. Evan's case, where, however, the cure depended probably upon inflammation extending to the sac. Supposing each of the main trunks to receive one-third of the whole volume of blood passing through the innominate, the obliteration of one of them will still leave two-thirds of the amount passing through the aneurism. But in addition to this, there should, I think, be taken into consideration the fact that the stream must be sent with more force through the carotid and subclavian trunks, which are the continuations of the main vessel, than into the branches of the subclavian which come off at right angles, or nearly so, to the main current. Thus, I am not surprised to find that even when the subclavian and its branches have become obliterated, the carotid being pervious, the aneurism continued to make progress, as in a case of Dr. Herbert Davies, reported in the London Hospital Reports, vol. i., where the aneurism eventually burst into the trachea. By cutting off the two main streams, and limiting the flow of blood to the branches of the subclavian artery, it appeared probable that a cure might be effected, not by the entire obstruction of the innominate artery, but by the deposit of fibrin within it and the aneurismal sac, so as to arrest the disease. Mr. Wardrop believed that the carotid was already obliterated in the case on which he first tied the subclavian for innominate aneurism; and had it been so, the result might have been different; but as the tumour diminished, the carotid, being relieved from pressure, began to beat again, and the aneurism to make progress. In an unpublished case in which M. Paul Broca has kindly communicated to me, and in which he tied the subclavian for an innominate aneurism in August, 1862, the carotid was thought to be obiliterated, but proved not to be so at the patient's death in the following February, the vessel being much displaced by the pressure of the tumour, and being reduced to about half its size. In this case, however, pulsation never returned in the vessel, which was obstructed, though not obliterated; and the case therefore resembles one of stimultaneous ligature of the two main trunks. The death of the patient was caused by

gangrene of the lung, and was in no way attributable to the aneurism, which was filled with fibrinous clot, leaving a cavity in the centre of the size of a small fowl's egg, communicating above with the carotid and subclavian, and below with the aorta. This last case may fairly be considered a cure as far as the aneurism is concerned (though M. Broca himself speaks of it as a "half-cure" *demi-guérison*,) and it may be classed with Mr. Fearn's well known case in which he tied the common carotid in 1836, and the subclavian artery in 1838. Here the patient died nearly four months after the *second* operation, from an attack of pleurisy unconnected with the aneurism, and due to an accident; and, as may be seen in the preparation in the museum of the College of Surgeons, the aneurism—which is a sacculated one, involving the aorta in some degree, as well as the root of the innominate artery—is thoroughly filled with laminated fibrine, a canal being left for the passage of the blood into the unobliterated branches of the subclavian artery.

My patient made a perfect recovery from the operation. Pulsation returned in the right temporal artery on the night of the operation, and in the brachial two days after. There were never any head symptoms. The tumor did not alter in size immediately, but two days after the operation the patient was able to lie down with perfect comfort; and by the third day the tumor had decidedly altered, and the pulsation could not be so distinctly felt, and there was a distinct double beat, but no bruit. By the sixth day after the operation the tumor had so much diminished that the outline of the inner end of the clavicle and upper margin of the sternum could be clearly defined, the pulsation being felt both above and below the bone. By the ninth day pulsation in the upper part of the tumor had nearly disappeared. On the eighteenth day both the ligatures came away without any hemorrhage. Attempts were made to favor the deposit of fibrine in the aneurism by the administration of the acetate of lead, by the application of ice to the tumor, and by careful regulation of the diet, but without any material advantage. The patient was discharged from hospital on March 6th, 1866, three months and a-half after the operation, in good health, with no symptoms referable to the aneurism, which was now apparent only by a pulsation through a hole in the upper part of the right side of the sternum, and not in the sterno-clavicular joint as had been at first supposed. The right radial pulse was feebly perceptible, and the circulation on the right side of the neck fully restored.

The next thing I heard of Julia W. was that she had been admitted to St. Bartholomew's on Sunday, April 8th, dead drunk. I visited her on the 11th, and found that the tumor had diminished slightly since she left the Westminister Hospital; certainly it had not increased. The pulsation appeared the same as before.

I heard nothing further until I learnt from Mr. Hill, of the Royal Free Hospital, that Julia W. had been brought there by the police, intoxicated, on May 10th. I visited her and found a murmur at the apex of the heart, which was not present before, and fancied the tumor to be slightly more prominent. Mr. Hill informed me that Julia W. had been a nurse in the hospital four years and a half before, when she suffered from an attack of rheumatic fever with heart affection, and that when she left the hospital a loud mitral murmur could be traced from the apex of the heart to the axillary region. She was in the Royal Free Hospital until August 8th, under Dr. Cockle, to whom I am indebted for the following notes of her condition:—

"The chief feature of interest in the progress of the case while in hospital was the variation in the size of the tumor; it sometimes being quite flat with scarcely any perceptible impulse, at other times becoming round and prominent, with strong impulse which could be both seen and felt. Sometimes the impulse gave a liquid, at others a solid impression. When the tumour made any sudden alteration in size, it was invariably preceded by a burning throbbing pain, increase of temperature, inability to lie on the back, and a sense of suffocation, with more or less *vomiting*, laryngeal voice, and pain in the shoulder, face, and side of the

head of the right side. These remarks refer particularly to the periods of increase only of the tumor, the decrease being unattended with any symptoms of distress. She had rheumatic pains in the limbs from time to time, which were relieved by iodide of potassium. The cardiac murmur never entirely disappeared. The right ulnar pulse was for the first time discovered on July 5th. She left the Royal Free Hospital on August 8th, when the tumour was small and flat, and the impulse very slight. The treatment adopted consisted in absolute rest, the arm being kept in a sling. Opiates were given, and sedative local applications used to relieve pain."

Julia W. was next heard of at St. George's Hospital, where she was taken by the park-keepers, who had found her insensible in the park. She was suffering from great difficulty in breathing when admitted, but soon recovered, and only stayed in the hospital two days.

I then quite lost sight of my patient until the 8th of November, when, being informed that she was in the custody of the police for being intoxicated, I procured her admission into the Westminster Hospital, and had the satisfaction of bringing her before the fellows of the Royal Medical and Chirurgical Society on the 11th of December, 1866. On her re-admission to the hospital, a year after the operation, I found that the tumour had decidedly diminished both in size and in distinctness of pulsation, though the hole in the sternum could still be felt, and it was here that the most prominent pulsation existed. The clavicle was not so much displaced as before. The woman appeared in very good health; her appetite was good, she could walk about without distress, and could lie down with perfect comfort. She said that she had occasional attacks of dyspnœa, and that these came on when she had been drinking; and this accounts for her visits to other hospitals. There was no bruit to be heard in the tumour, nor any abnormal sound in the heart.

J. W. continued to lead a very irregular life, and was taken by the police to almost every hospital in London; but the disease underwent no material alteration until about two years after she was under my care, when the resident officer of one of the institutions to which she was taken when overcome by drink unfortunately administered powerful emetics to her, not being aware of her condition. After this, the tumor, which could before be felt beating through the sternum, became much more prominent, and gradually increased in size until the skin became involved and discolored. I procured her admission into the St. Elizabeth's Hospital some months before her death, and she received there every kindness and attention from the authorities, and from Mr. Tegart, the visiting surgeon. She then complained of constant pain in the aneurism, which was relieved by the local application of morphia, and had occasional attacks of dyspnœa and prostration. A month before her death, there having been for some time a large ecchymosis over the tumor, an arterial bleeding occurred, but this was checked by styptics. Bleedings occurred from time to time, and at last, on December 8th, 1869, she died after a copious hemorrhage.

On post-mortem examination the innominate artery was found to be healthy, except that it was somewhat enlarged at its origin. The arch of the aorta was extensively aneurismal. Immediately above the pulmonary artery the aorta was dilated, and presented a double pouch to the right side. Immediately above this, and extending up to, but not involving, the origin of the innominata, was the origin of the sac of the aneurism which had burst through the sternum; and externally, in front of the manubrium, was the thin-walled sac full of soft coagulum, which had given way toward the left side above. On opening the aneurismal tumor within the thorax, it was found to be a distinctly sacculated aneurism, springing from the right side of the ascending portion of the arch of the aorta, higher than appeared externally, owing to the lower part of the aneurism having grown downwards and to the right. This portion of the sac contained firm, laminated fibrine, to the thickness of one-third of an inch. The portion of the aneurism attached to the sternum contained no fibrine, except the loose clot in the outer sac. The subclavian artery was reduced to a fibrous cord, one inch

in length, immediately outside the scalenus, and the right common carotid was obliterated in the whole of its course, the point of ligature being marked by a delicate fibrous cord, and the upper inch and lower two inches of the vessel forming a flat fibrous band, nearly one-fourth of an inch wide. The collateral circulation in the arm and neck had been fully established. The preparation was brought before the Pathological Society of London on April 19th, and a more detailed description, with a drawing, will appear in the next volume of the Society's transactions.

The preceding case appears to raise a very important question in practical medicine and surgery—wether in cases of aneurism of the arch of the aorta, it is not possible to afford relief by surgical interference. There can be no question that my patient's urgent symptoms of dyspnœa and dysphagia were relieved by the double ligature, and that her life was prolonged very considerably under the most untoward circumstances. Dr. Cockle has already (the *Lancet*, April 10th, 1869) urged the ligature of the carotid in cases of aortic aneurism which are making progress in spite of medical treatment; and when the disease involves the transverse portion of the arch, I should be inclined to follow the suggestion as regards the *left* carotid. But when the disease involves the ascending portion of the arch, I bellieve the only hope of success will be in tying both the right carotid and subclavian, so as to diminish as far as possible the current through the innominata, agreeing as I do with Dr. Sibson in the importance of attacking the vessel next to the aneurism.

In reference to the cases of distal ligature, quoted by Dr. Cockle in his valuable paper already referred to, I may remark that both the cases of Tillanus and Rigen, in which cure of an aortic aneurism followed ligature of the carotid, were examples of ligature of the *left* carotid, the aneurism being on the transverse portion of the arch. In Montgomery's case the ligature was also on the *left* side, and the aneurism was found four months after the operation to involve the aorta between the innominata and left carotid arteries, thus supporting the view I have put forward above. In Mr. Maunder's case, in which he in 1867 followed my example of tying the two arteries on the right side for the supposed innominate aneurism, the disease proved to be principally aortic, and the coagulation had extended down to the heart, and thus occasioned death. In my own case, the aneurism being more distinctly sacculated, this untoward result did not occur, nor is it to be nenecessarily anticipated in another case.

Before quitting the subject it may be well to note that in two cases, at least, distal pressure has given relief in aneurisms of the root of the neck probably involving the aorta. In the *Edinburgh Journal* for October 1847, p. 229, there is a report of a case by Dr. Lyon, in which the patient had a large aneurism of the size of the fist, reaching upwards from the sternum, on the right side. Pressure on the carotid was made at intervals, and the tumor became more solid. The patient was of intemperate habits, and died of bursting of the sac into the pleura after twenty months. The aneurism was found to involve the innominate and aorta. Thera was a large fibrinous deposit opposite the attachment to the right sterno-clavicular joint, and the other parts of the sac were filled with soft coagulum. In the *Lancet* of Jan. 9th, 1858, the late Mr. A. M. Edwards, of Edinburgh, has recorded a case of supposed innominate aneurism in a woman of fifty, in whom Dr. Laycock pronounced the aorta also to be implicated, and in whom great relief of all distressing symptoms was procured by the adaptation of pressure to the right common carotid and subclavian arteries. Unfortunately the termination of the case and post-mortem appearance have not, so far as I know, been published.—*Lancet, July* 2, 1870, *p.* 11.

ALIMENTARY CANAL.

66.—A NEW TONSIL GUILLOTINE.

By Dr. JOHN EWENS, Cerne Abbas, Dorset.

[The following appears to us a decided addition to the instrument of Mathieu for removing the tonsils. There is in children such a natural inclination to close the mouth, when the tonsils are pressed against, that it is often with the greatest difficulty that the operation can be concluded successfully.]

It seemed to me that a gag might be so adjusted to the instrument of Mathieu as to prevent this closure, at the same time acting as a tongue depressor. Mr. Hawksley, of Blenheim-street, Bond-street, London, has met my difficulty, and has constructed for me an instrument which answers the purpose fully. After being adjusted over the tonsil, by a single continuous movement of the thumb, transfixion and amputation are instantaneously accomplished, without a chance of failure, and with the utmost facility, the mouth being kept wide open by the gag for the adjustment of the instrument over the tonsil and during its removal. I have thus removed the tonsils of three children very recently, with the utmost comfort to myself and security to the patient; and, as the majority of cases come under the notice of medical men whilst the patients are children (and generally intractable), I consider the improvement in the instrument will prove a great boon to any who have to perform this, if not formidable or generally dangerous, at least troublesome, operation.—*Lancet, May* 21, 1870, *p.* 730.

67.—NEW INSTRUMENT FOR THE OPERATION IN FISTULA IN ANO.

In a recent case of operation for fistula in ano, instead of the usual plan of introducing the bistoury through the fistula, and bringing it down through the sphincter, Mr. Weeden Cooke used a scissors constructed for him by Messrs. Weiss. The finger having been introduced into the rectum as a guide, Mr. Cooke passed one blade of the scissors into the fistula up to its extreme point, and then the other blade into the rectum. The two blades, were then connected by a small screw, and by one rapid scissors action the sphincter was divided.

As the position required for this operation renders it unadvisable to give chloroform, and as the patient, unless very carefully held by assistants, often shrinks so as greatly to embarrass the surgeon, any plan which ensures rapidity is advantageous, and it is with this view that the mode of operation described has been suggested. It was thought that it caused less pain than the bistoury.—*Lancet, June* 4, 1870, *p.* 803.

URINARY ORGANS.

68.—ANALYSIS OF 184 CASES OF STONE IN THE BLADDER OF THE ADULT TREATED BY LITHOTRITY.

By Sir HENRY THOMPSON, Bart.

[The following is an abstract of Sir Henry Thompson's paper. It was read before the Royal Medical and Chirurgical Society.]

The author presented a series of 184 consecutive cases of lithotrity in the adult, operated upon within a recent period; all treated by the same method and with the same instruments. He furnished all the most im-

portant details relating to each case, and presented the stone itself in almost every instance, preserved for inspection. His object was to make an impartial estimate of the crushing operation, to ascertain its real value, and its place among surgical operations. Although this had never yet been fully done, he regarded Sir B. Brodie's last communication to the Medical and Chirurgical Society as perhaps the most trustworthy and valuable record, so far as it goes, which exists on the subject. In order to accomplish this object, he had made carefully written records of every case; and he cited the following circumstances as necessary to be taken into consideration: that the 184 cases had been treated by a uniform method, within a comparatively brief period of time; that all were adults, and embraced much variety of constitution; that all the important facts relative to each were noted in a history of each one, which was attached to the paper as an appendix; and that a large proportion of the calculi were of considerable size. And the author believed he was correct in saying that so complete an opportunity for studying the results of lithotrity had not been offered hitherto, since, as far as he was aware, the data necessary for the formation of a judgment had not been presented to the profession, either in this country or elsewhere.

The results of the operation were discussed under the following heads:—1st. The rate per cent. of recovery after the operation, and the causes of death when it occurred. 2nd. The general condition of the patient after the operation. 3rd. The frequency of recurrence of stone after lithotrity.

The chief facts relative to the 184 cases were as follows: They were consecutive in point of time, no case being omitted; that all were adults, and mostly of advanced age; that they included many individuals of very feeble health and constitution; that they were chiefly British, although several were from other nations. The mean age of the 184 cases was no less than sixty-one years. The youngest was twenty-two years old. Only three were below thirty years. The oldest was eighty-four years. There were forty-six cases of seventy years and upward. With very few exceptions, all stones of an ounce and upward were reserved for lithotomy. All obviously below that were crushed. Not one case was refused operation, not one was left unfinished, and in no instance was an operation of lithotrity completed by lithotomy. The recoveries, reckoning every kind of casualty following the operation, were 93 per cent.; but omitting five cases of death, not by any means due to it, the mortality amounted to only 4 per cent. A second operation for recurrence of the stone was performed for thirteen of the 184 cases; 122 were uric acid and the urates; 16 were mixed; 40 were phosphatic; 4 oxalate of lime; 1 cystic oxide; and 1 pure phosphate of lime.

The important logical conclusion to be derived from the mass of facts considered was, that lithotrity is an eminently successful operation. For a certain number of cases, its success may be regarded as a certainty—absolutely without fear of any contingency, except such as attends the minor operations of surgery,—for example, the opening of a small abscess, or the passing of a catheter. For the author stated that he had never lost a patient in the whole course of his experience after crushing a stone which was no larger than a small nut; and this he considered was a size at which, with few exceptions, every stone ought to be discovered. But this very fact led the author to remark that the success of lithotrity cannot therefore be considered apart from a knowledge of the extent, in regard of the magnitude of the stone and the constitution of the patient, to which the capabilities of the operation have been pushed. When it is employed for stones as large as a date, or a small chesnut—and it is impossible to deny the excellent chance of success which this method offers to the subjects of such stones—a certain, but still only small, proportion of deaths must be expected. And the rate of mortality will correspond with augmentation in the size of the stone, and with the amount of existing disease and age on the part of the patient. Given a small stone in a fairly healthy person, and success is certain; the possibility of contingency in such a case de-

pending only on the presence of those remote and excessively rare conditions which will make for an individual here and there the mere passing of a catheter a cause of death.

The rule observed had been, for the most part, to apply lithotrity to all calculi obviously less than an ounce in weight, easily discovered by sounding, and to operate on all larger ones by lithotomy.—*Lancet, June* 4, 1870, *p.* 805.

69.—A CASE OF SEVERE STRICTURE OF THE URETHRA.

By T. Vincent Jackson, Esq., Senior Surgeon to the South Staffordshire General Hospital, Wolverhampton.

The following case has lately been under my care,—and illustrates so well the advantages of certain plans of treasment, that I have no hesitation in placing them on record. The relief of severe and complicated cases of urethral stricture is one of great surgical interest, and I am sure that all practical Surgeons who are much employed in the management of these affections will readily admit that no one plan of treatment will answer for all cases; that, in fact, we must have more than one string to our bow. In ordinary examples of stricture simple dilatation is quite sufficient to effect all that is necessary, and in no way can this be so easily, effectively, and, as it were, painlessly obtained as by the use of some soft instrument—bougie or catheter—and in this manner a large number of the cases which present themselves either in the out-patient room or in private practice can be dealt with. For the more severe and complicated classes less simple measures are required, but mostly for their employment (excluding all cutting operations) it is a *sine qua non* that there should be such a continuity and sufficient patency of the urethra that an instrument can be carried into the bladder, and this, if the Surgeon wills it, can be tied in and retained at his discretion, then withdrawn and a larger one substituted, and the process repeated until the calibre, or near about, of the healthy urethra is reached. This plan has its advantages and its disadvantages. The advantages are the rapidity, ease, and the minimum amount of pain which it entails on the patient ordinarily; the disadvantages, that it necessitates keeping the sufferer in bed; and my experience leads me to the conclusion that a contraction of the stricture more quickly takes place after continuous dilatation than after other plans of treatment.

A modification of the above is very frequently employed, in fact we are compelled by our own fears to adopt it as far as the first step; for a Surgeon perhaps has spent an hour or more in getting through a stricture, succeeding at last, if the case is one of retention also, in emptying the bladder through the smallest metallic or non-metallic catheter. Who likes to withdraw it? The patient is well aware of this, and says: "You won't take it out?" and so it is tied in and retained for such a time as will allow, upon its withdrawal, a dilator of some sort to be introduced, and "splitting" or distention terminates the proceedings. Splitting an urethral stricture is an operation of recent times, and its proposer, Mr. Holt, has in no way spoken too highly of it; up to the present time I have used his dilator one hundred times. I have not picked my cases, and the very worst that have come before me have tested approvingly this method. The summary of my experience of it is the following:—The operation is one that can be easily borne without chloroform, but it is far from being anything like painless; the moment No. 10 or 12 tube enters the meatus, as it is pushed along the hollow conducting rod, flinching and a general involuntary muscular resistance commences, reaching its maximum when the stricture is split, and frequently also at this moment extorting a lamentation. The pain certainly does not subside until the dilator is withdrawn, and as a rule it lasts for some time after. Hemorrhage to some extent, frequently hardly noticeable, always takes place. The bladder should be evacuated after the withdrawal of the splitting instrument by the introduc-

tion of No. 11 or 12 silver catheter, but there is not the slightest clinical necessity to tie it in. Sequential to the operation; rest either in bed or on a couch is necessary, and I never omit ordering a draught of opium and quinine to be taken immediately, and I am convinced it has warded off many a shiver. In the course of two or three days a full-sized metal instrument should be passed into the bladder, and the introduction repeated twice a week for a fortnight. Finally, the patient is instructed how to pass an instrument for himself, the perpetuation of the cure being thus left in his own hands.

A favourite form of instrument with me is one which, a few years since, I devised, and had a set of them made for the treatment of stricture by simple dilatation. Originally they were solid throughout, but lately I have had them constructed partly solid and partly hollow, combining all the advantages of the catheter and sound, permitting an evacuation of the bladder on each occasion of their employment; and I regard this as of some moment, especially after the operation of splitting, for necessarily the passage of an instrument, however well managed, must produce an irritation of the split portion, and I take it this will be intensified in the case of a catheter, the eyelets on its side catching maybap a portion of the painful tissue, which by dipping in, becomes grazed, and more suffering than is desired consequently inflicted; therefore to reduce this to a minimum and obviate any reirritation by the urine afterwards, I always empty the bladder at the time of the instrumental introduction, and, for the reason named, I decline to use a catheter, but employ the "catheter conical sound" instead.

In considering the question of the applicability of conical sounds for the treatment of stricture of the urethra, it appeared to me that a slight alteration in their construction would be an advantage in many cases. What I mean is, that the form of the instrument instead of resembling simply an elongated cone, should be made so as to consist of two cones, their bases being conjoined, and the following plan is the one I have adapted in their formation. The first cone commences at the extreme point of the instrument, and extends for a distance of 3 inches, its base here meeting with a second cone, and this latter gradually and almost imperceptibly diminishing in size, reaches the handle, a distance of 6 inches. From such a construction it is evident that the maximum cylindrical thickness is obtained at a certain known distance from the point, for up to this point the calibre of the instrument gradually increases, and from this point it gradually decreases; for instance, let us say that the point of the sound is equal to 8, 3 inches from the point is equal to 12, and at the handle, a distance of about 6 inches, it equals 9; the first cone, therefore, is shorter and of a less circumference (except at the base) than the second.

Hitherto these sounds, their precise form and curve varying according to the whim of individual surgeons, have been manufactured solid, but a few years since I altered my instrument in such a way that it became partly solid and partly hollow, solid for a short way from the point, and for the remaining distance channelled.

Rarely but still occasionally cases of neglected urethral stricture turn up which are instrumentally impassable, the urine escaping by fistulous perineal tracts, a drop or two now and then leaking through the meatus urinarius.

External urethrotomy is the operation usually resorted to to restore the urethral conduit, but in one of the cases I record I adopted a milder treatment; the feebleness of the patient forbidding, I considered, a cutting operation. I relied, therefore, upon the potassa fusa to destroy the callous tissue, and fortunately not in vain. At the present time the employment of chemical caustics in the treatment of stricture is not very fashionable. Nitrate of silver, proposed by John Hunter and almost universally employed by Sir E. Home for the treatment of every variety of stricture, is now better confined to those limited numbers of sensitive strictures, *which*, bleeding at every touch, are rendered immediately amenable to

dilatation by cauterising their face two or three times with a waxed bougie armed with a bit of lunar caustic. A few surgeons systematically follow the practice of the late Mr. Whateley, of destroying the thickened tissue by the application of potassa fusa at regular intervals, and notably amongst these surgeons stands Mr. Wade, whose experience has taught him Mr. Whateley's fears upon one point are groundless, and that strictures which are instrumentally impassable are with proper precautions as safely and successfully to be treated by caustic potash as those which are instrumentally passable. "I commonly," says Mr. Wade, "adopt potassa fusa in impassable stricture from a conviction that it is, at all events, the safest, if not, as I certainly believe it to be, the most effectual, for the relief of the patient in the majority of such cases.—*Medical Times and Gazette, June* 4, p. 604.

AFGECTIONS OF THE EYE.

70.—ON CATARACT.

By Haynes Walton, Esq., Surgeon to St. Mary's Hospital.

The removal of cataract: General considerations.—There are many points here that demand careful consideration.

It is a cardinal point in ophthalmic surgery not to operate on an eye for the removal of cataract, so long as it may be rendered available for ordinary purposes; by optical appliances, or otherwise, except at the request of a patient, and after he is made aware of all the circumstances of the case.

An operation ought never to be undertaken in anticipation of blindness, because the cataract may not increase, and the hard variety is often very slow in maturity. Years may pass away with but little progress. The several conditions of lenticular cataract require different operations, and the choice of any one should rest solely on the circumstances of the disease.

The hard cataract should, as a rule, be extracted, that is, removed from the eye, or displaced, by being pressed into the vitreous humour. So long, therefore, as the opaque lens is yet hard, and not reduced in density by the secondary changes of atrophy, it would be imprudent to attempt to make it disappear by absorption, because such action would be very slow, and during the tedious process, the eye is particularly liable to inflame, and so be thereby damaged. Besides any particles of the cataract which might fall into the anterior chamber, or the posterior, would most likely set up an attack of inflammation and endanger the eye. The failing nutrition of the eye of an old person renders it most unfitted to bear irritation from such a source, for while it causes high susceptibility, it destroys power of resistance.

Some years ago I tried with the utmost care, to effect absorption in patients beyond the age to which this method is generally restricted by most surgeons, and although I did get some good effects, the general result fell far below that from extraction. Now I always extract when there is any visible amber change in the cataract, and also when the lens has a brittish surface, the result of the secondary change, if the age of the patient renders it likely that there is an amber-coloured nucleus, and hard.

Soft cataract should, as a rule, be allowed to remain in place and be lacerated, or so broken as to admit of the process of absorption, or solution, to which its softer texture readily yields; for with this simple operation, the natural powers are quite capable of causing its complete dissipation.

Capsular cataract must be removed from the eye, or be cut, or torn through, to enable it to contract.

Preparation of a patient.—Operations implicating the globe of the eye demand for their success, so far as the body of the individual is concerned, that state of health in which a wound can be inflicted on a delicate and sensitive organ *with the greatest* impunity. In the operation for extrac-

tion, unless union of the cornea be quickly effected by adhesion, success must always be more or less imperfect, and destruction of the organ will frequently ensue.

Although we have no means by which to test this bodily state, because there may be power enough where its pressure is doubted, and it may be lacking in those who are apparently in good health, yet certain bodily conditions can be pronounced, as being in the main unfavourable. Those persons who have long undergone want of sufficient food give the worst results. My success with hospital patients never equals that in private life.

A debilitated constitution requires to be improved to the highest standard that the idiosyncrasy of the person will allow.

Plethora should always be avoided. An accustomed eye soon detects the habit of body that is popularly called "rude health," and a person exhibiting it in a market degree should be reduced by regulation of diet, exercise, and gentle purgation if necessary, till any excess disappears, and the circulation is rendered more natural.

So long as we are unable to say where health ends, and disease begins, and to make a distinction between the failing of the living machine from decay and actual disease, a patient should be left alone, except he exhibit some decided abnormal constitutional symptoms, respecting which we can be tolerably sure about the beneficial effect of treatment, I do nothing for the great majority of my patients.

Dr. Jacob, in his *brochure* on the operation for cataract with the fine needle, makes excellent remarks, which are not less practical than original. He says the value of preparatory and after-treatment, as part of the surgeon's care in cataract operations, has been fully appreciated, and, in practice, amply made available; but the value of a respectful consideration of all the functions of the animal economy upon which health depends has not been so well understood. It is assumed, he continues, that a patient should be prepared for an operation by taking physic and abstaining from food; yet a rational man, acquainted with the consecutive operation of each apparatus provided for the growth, repair, and preservation of the living being, may well doubt the correctness of such a view. The universal faith reposed in the practice of giving and taking physic has led practitioners not only to place too much reliance on that resource, but to resort to it sometimes to the injury of the patient. In preparing a patient for an operation, he does not act on the belief that empty bowels are essential to health, or that what are called *fæces* should not be found in the intestinal canal; on the contrary, he proceeds on a conviction totally different. If a patient be in good health, notwithstanding an habitual retention of the contents of the bowels beyond the prescribed periods, he does not risk an interruption of health by disturbing the natural functions of the stomach and bowels, and therefore refrains from giving physic. But if not in good health, he endeavours to bring him into that condition by every means, and resolutely resists every attempt to induce him to operate until he has accomplished that object. Above all things he thinks that the state of the digestive organs should be carefully studied, and when found defective, if possible repaired. He believes that nothing seems to require more attention than the condition of the tongue as indicative of the state of the stomach and bowels. If it be coated with discoloured adhesive mucus, the functions of assimilation and nutrition are probably imperfectly performed, and a resultin tendency to destructive inflammation from local injury is engendered. He writes in conclusion, it is usual in preparing for this and other operations to make great alterations in diet, substituting liquid for solid, and vegetable for animal elements. This, however, must be done with caution, leading as it inevitably does, to disturbance of the digestive function and interruption of the assimilating and nutritive processes, if suddenly or exclusively adopted. Without digestible nutritious food, good chyle and blood cannot be produced, and without good blood, local injuries are liable to suffer from destructive inflammation. I endorse all this.

The whitish and rather coated tongue of the aged should not be mistaken for a symptom of unhealthiness. In them this organ is not so ready an index of the state of health as in early years; attention should therefore be paid to the urine, the deposition of uric acid, or of the urate of ammonia, being a sure indication of dyspepsia, or excess of nitrogenised food, or of fever; and that of phosphate of lime, or the triple phosphate of the opposite states of prostration and nervous depression. Yet an operation should not be undertaken with a decidedly loaded tongue. The abdominal evacuation should, with the least apparent necessity, be examined for evidence of the hepatic state, and for information respecting the digestion of food, particularly in those past the meridian of life, because it is then that these functions are mostly at fault, and all kinds of operations less succesful. In the majority of persons far advanced in years, who have passed through operations under my hands, it has been necessary to increase, or, if I may so call it, force the circulation, by tonics and stimulants. Towards the limit of the natural term of life, we should not without ample necessity, cut off the accustomed amount of daily nourishment of the usual stimuli.

My immediate preparation of a patient is never more than the administration of some mild laxative the day before operating, solely that the necessary quiet after the operation may not be disturbed for a day or two by the natural action of the bowels, and any likelihood of straining at stool may be avoided.

Some general conditions contraindicate operating.—The presence of active specific inflammation, as the strumous, gouty, syphilitic, or rheumatic, in any part of the body, would contraindicate an operation. So also may be said of the time of pregnancy. Some surgeons avoid the period of menstruation.

Organic disease in the chest is not necessarily an impediment to operating. I saw extraction done on the eye of a female, 57 years old, who had valvular disease of the heart, ascites, and anasarca. The operation was quite successful, and the patient returned home on the eleventh day after its performance. Her heart had been diseased for five years. I have operated several times respectively when the heart has been diseased, and in the early stage of phthisis.

Kidney disease renders a person most unfavourable for an operation.

Atheromatus arteries interfere with primary union of the cornea in extraction.

While unquestionably the result of an operation of any kind will much turn on the state of the patient's health, that for solution may be undertaken and success secured, when that for extraction is scarcely admissible, and unfortunately the latter is most required when the complications are most likely to exist, namely, in old age. Chronic bronchitis, and asthma, interfere, I believe, more from their general effect than any mechanical disturbance to the eye from the cough, although if this be violent, it will prevent the healing in the right way.

As we cannot select our patients or reject according to the absence of complications, or the presence of them, we should never operate under disadvantageous circumstances, without making the drawbacks known to the patient or his friends.

Advanced age is not in itself an objection to operating if nothing else forbid. The best attainable results have followed extraction after 90, in the hands of Sir W. Lawrence. The late Mr. Scott did the same operation on a female between 90 and 100. I have several times performed it to my complete satisfaction, after the eightieth year, and once as late as the eighty-sixth. Two cases of success are recorded after the patients have turned 100 years each. Of course after the seventieth year a person is less favourable for the ordeal of extraction, from a variety of circumstances and from contingencies inseparable from long life,

When only one eye is blind from cataract, whether an operation should be

done, is a question about which it is likely there will be a difference opinion. The subject admits of discussion.

The removal of the cartaract is not demanded on the score of the retii losing its function, because it is veiled. The retina does not becor diseased from cataract. This has been proved over and over.

A person with one eye, although not half-blind, labours under ve great disatvantages, the greatest of which is the narrowing of the field vision laterally; he is blind on one side.

Theoretically, there is no drawback or disadvantage to the removal the cataract.

The age of an individual assists much in determining the course to l pursued.

In early life the appearance of cataract in one eye may materially affe a person's prospects. It is at this time, too, that a cataract is more visib from its nature, being soft. Now also the operation which is applicabl that for solution, is almost sure to succeed.

Late in life the prospects of an individual, social and otherwise, a quite altered, and personal appearance is not then of so much value, a the suitable operation, that of extraction, is not so certain. On mai points, therefore, an operation is more admsssible in a young person. Tl advantages, notwithstanding the imperfect image on the retina of tl lensless eye, from the circles of dispersion, are enlargement of the visu field, and as the eyes act together in binocular vision, increase in t intensity of optical impressions and better applications of the dimensio of bodies, and improvement in the judging of short distances.

Pratically there is not any disadvantage in operating. In eve instance in which I have removed the cataract both in young persons a in those of middle life, I have received the distinct assurance from eac that much advantage was obtained, and all were pleased at having unde gone the treatment.

Several times I have endeavoured to unite the foci of the eyes, f distant vision, and for near, so as to give a common distinct preceptio by means of convex glasses, but I have been unable to effect satisfactorily on account of the inequality of the images, and the loss accomodation in the one eye.

The rule therefore which I follow is, in early life, to advise an operati and late in life to state the particulars to my patient, and ask him to decide.

When one eye is blind, and the other so far affected also with cataract materially to impair sight, there can be no question in the abstract about t propriety of operating on that which is fully cataractous. There is no reas why a person should be allowed to become quite blind in both eyes befo sight is restored. Much inconvenience is prevented by operating on t one eye before the other is obscured.

When both eyes are equally affected with blindness, only one at time shou be operated on for extaction, and the first should be allowed to recover beft the other is touched. There is thereby less shock to the system. Beside if in a first operation there appears some constitutional peculiarity of b tendency, it may be removed, or in some measure reduced, before t second is undertaken,

When the double operation is done, inflammatory effects on the syste from one eye going wrong might be the means of spoiling the heali process in the other.

Both eyes may be operated on at the same time for solution.

The operation for extraction should be done at a certain stage of the cat act.—It may be performed too early and too late.

When the lens is not entirely pervaded by atrophy, the circumferer has not undergone that change which will enable it to quit the caps readily, and an easy escape is an important element in the success of t operation. Besides, while there remains any surface lens tissue unaltere much of it, or all of it, is tolerably sure to be left in the capsule, and sor may remain in the chambers of the eye; in either case irritation is produce

and there may be some inflammation. Therefore, a cataract should be matured before an attempt is made to extract it.

Some surgeons have adopted the process of what they call anticipating the cataract by pricking it with a needle, so as to render it fully opaque. This is to be condemned; injurious inflammation is risked, and the eye is always rendered less fitted for the extraction, as it always inflames a little in old people. Healthy lens tissue resists a wound more than that which has atrophied. Again, if this be done with the view of getting the cataract to quit the capsule easier, it is useless, for there is not that softening at the surface which is so characteristic of the natural atrophy.

Cataracts that have undergone the secondary change or late atrophy, in which calcareous deposits have formed on the surface and on the inside of the capsule, thickening it, are less favorable for treatment, because not only does not the capsule not retract as is desirable when it is scratched with the curette, and allow of the easy escape of the cataract, but the cutaneous deposits are more or less retained, and accordingly obscure the pupil.

The operation for solution should not be undertaken until the cataract is thoroughly mature, because any healthy lens tissue that is rendered opaque by the operation, and exposed to the aqueous humor, invariably swells very much more than that which is cataractous, and thrusts the capsule against the iris, producing adhesions between the two, and may besides cause injurious effects to the eye from pressure. At the same time it should not be delayed till secondary degeneration is far advanced, and because then the capsule is likely to be much affected, and therefore trouble may arise from thickened capsule being in the pupil.

A surgeon should be cautious, even under the most favorable circumstances, never to overrate the chances of success of any operation for cataract, nor to allow it to be thought that any is infallible. Above all, when there is the slightest indication which would render the result questionable, or imperfect, owing to individual peculiarity or constitutional taint, hereditary or acquired, it is right as regards the patient, and a safe provision for himself, that all the particulars for and against operating should be stated clearly and intelligibly without the least dissimulation.

The season of the year most fitted for operating has occupied attention. With respect to needle operations, I suspect it matters not; nor, perhaps, is any operation in our climate influenced by the mere degree of temperature, which is rarely in either extreme. In extracting in cold weather, the room to which the patient is confined I have kept at a uniform temperature—not lower than 60° Fahrenheit for the first few days. Many very excellent surgeons never extract in winter, and Mr. Tyrrell thought the best time for that operation to be between March and October. Where a choice is permitted, I should, as a rule, prefer that period, because regular excercise prior to the operation is less likely to be interfered with, from the greater certainty of settled weather, while the apartment can be better ventilated, and the patient will be able sooner to take out-door exercise, and recover his lost strength and spirits, the consequence of anxiety and confinement. At this time, therefore, convalescence is less likely to be protracted. Again, when the state of the eye is such as to render the success of the operation somewhat doubtful, I should prefer summer weather.

Operation for extraction, by a crescentic corneal cut.—This is the operation which is the most suited for the removal of a hard cataract. By it alone can the best results be obtained, and, as I believe, the highest average of recovery. It is preferable to all methods of extraction, whether in the hands of the inexperienced or in those of experts.

Extraction is frequently referred to as one of the most difficult operations in opthalmic surgery. While I fully admit that for accurate execution, great nicety and practice are needed, I do not hesitate to say that its difficulties are greatly exaggerated.

Every step of the operation requires to be well done, or failure ensues. All must be exact.

The pupil should be always dilated, because more room is then given for the

laceration of the capsule.—Some of the dilatation is lost when the aqueous humor escapes, but some remains. The dilatation may have some effect in keeping the iris out of the way of the knife. It, too, will always discover the existence of any adhesion between the iris and the capsule of the opaque lens, and disclose that state of the iris, apart from adhesion and inflammatory disease, whereby it will not expand much, and which is an obstacle to the escape over the cataract.

A patient should always lie down, at full length, on his back, with his head alone a little raised. He can be steady only in this position. It matters not whether the operator sits or stands, so long as he has sufficient command of his work.

The importance of a properly regulated light is evident. An operator will, of course, choose that which according to the arrangement of the room, suits best. In private practice he should ascertain this by trial with his assistant, before the patient is brought in. A few general directions may be useful. The patient should be placed near a window obliquely, so that the eye will be lightened, while the light is not reflected from the centre of the cornea, so as to prevent the operator from seeing clearly what is necessary to be done. A position exactly opposite the window will produce the reflection which obscures. It is better to have only one window open, and the lower part of that should be closed by shutters, or screened by a blind, as it is advantageous to have the light from above. Sunshine must be avoided.

All the principal articles of clothing should be taken off, the patient prepared to go to bed, and a morning gown put on, to prevent the inconvenience of undressing afterwards.

I divide the cornea in the upper part, preferring that section as it possesses many advantages over the lower, such as the greater certainty in making it effectually, the less likelihood of the flap being interfered with by the eyelid, and the upper position of the pupil, should the iris prolapse. Besides, if the prolapse occurs in the form of a marked tumor, it will be less irritated here. Any cicatrix is also better hidden.

It is better to stand behind the patient in every instance, as it gives much greater command over the globe of the eye. But when the left eye is to be treated, if want of practice or deficiency of confidence disqualify the left hand, the operator must stand in front, and submit to the great disadvantage of resigning to another, his assistant, what he ought to do himself, as most important acts, the retracting of the upper eyelid, and the steadying of the eyeball, while he uses the knife in the direction he prefers, upwards or downwards.

I always grease my knife slightly with olive oil, because it prevents the corneal flap from sticking to it, no slight advantage.—*Medical Times and Gazette, July* 23 and *September* 24, 1870, *pp.* 88, 358.

71.—ON EXTRACTION OF CATARACT BY VON GRAEFE'S PERIPHERAL LINEAR SECTION.

By Henry Wilson, Esq., Assistant-Surgeon to St. Mark's Opthalmic Hospital.

Von Graefe endeavors to avoid the principal dangers of flap extraction, by making the section as small as possible compatible with the exit of the lens, in such a structure as is least liable to suppurative inflammation, and in such a position and manner as will allow of the most facile delivery of the lens and of the most perfect coaption of the surfaces of the wound, as well as by adopting such precautionary measures as are likely to guard against subsequent destructive inflammation. These objects he attains, I conceive, by executing a small nearly straight section in the sclerotic border, and corneosclerotic junction, nearly opposite the margin of the lens, by making a conjunctival flap which shall cover the wound, and by performing an iridectomy.

It is well known that wounds in the sclerotic and corneosclerotic junction

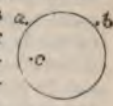
are less liable to suppurative inflammation, and that they heal more readily than those in the transparent cornea; the external wound measures $4\frac{1}{2}'''$—$5'''$ and the internal one $4\frac{1}{2}'''$, the height of the flap does not exceed $\frac{1}{4}'''$, whereas it measured $2'''$—$2\frac{1}{2}'''$ in the old flap extraction. The wound in von Graefe's operation, though strictly not a linear one, may for all practical purposes be regarded as such; its surfaces lie in exact apposition, it is covered over by the conjunctiva, and is in every respect in the most favorable position for immediate union. By a reference to the illustration it will be seen that the opening is as nearly opposite the margin of the lens as is possible without interfering with the ciliary body and processes. The manifest advantage of this position as regards the delivery of the lens, is that when the iris is removed, the capsule opened and pressure made at the opposite side of the globe, the lens glides easily and naturally into and through the wound; the disadvantage is that the internal corneal margin being cut across the zonula is thereby deprived of its support, and there arises a tendency towards escape of vitreous, a circumstance which has occurred in about twenty-five per cent. of the cases I have operated on.

The operation is performed as follows :—The patient is placed in the recumbent position, on a couch or bed opposite a good light, the eye not to be operated on is covered or bandaged down, the eyelids separated by the spring speculum, and the globe drawn downwards by a toothed forceps applied immediately below the inferior margin of the cornea; in fixing the eyeball a broad fold including the sub-conjunctival cellular tissue and even the insertion of the inferior rectus if feasible should be grasped between the blades of the forceps, for the conjunctiva alone affords often but a slight hold and is liable to be torn through. In fixing the globe it should be rotated directly downwards, otherwise the section and consequently the iridectomy will fall towards one side and the resulting coloboma will be exposed to view and appear unsightly as well give rise very possibly to disturbing dazzling. When the operator has thus steadied the eyeball he holds the knife here figured in his other hand, its flat surface parallel to the plane of the iris, its cutting edge directed upwards and

Fig. 1.

inwards, and inserts its point into the sclerotic $\frac{1}{2}'''$ from the corneal margin at *b*, Fig. 2, copied from v. Graefe, which represents the left eye, and pushes the instrument obliquely downwards and inwards into the periphery of the anterior chamber towards *c*, in order to secure a large internal wound. When the knife has entered the chamber in this direction, to the extent of $3'''$ or $3\frac{1}{2}'''$ its handle is depressed and the point thus elevated is directed towards the counter puncture *a*, and pushed onwards beneath the opaque cornea into and through the sclerotic border. When the point of the knife has penetrated the sclerotic and appears either underneath or outside the conjunctiva, the cutting edge of the instrument should be turned very slightly forwards, and the section completed in the corneo-sclerotic junction, either by a sawing motion or an onward thrust. The blade of the knife then lies free immediately underneath the conjunctiva, and should be still further rotated with its cutting edge forwards, or even forwards and downwards and the conjunctiva divided in this direction. By this means a conjunctival flap of not too large dimensions is formed which subsequently covers the wound. In making this section the knife should be entered at the extreme periphery of the anterior chamber, and should leave it in a similar position; care must however be taken not to introduce the knife too far downwards and inwards into the chamber before reaching the counter-punctuation, and not to direct the point of the knife too far backwards, otherwise a large gaping wound will be made in the sclerotic implicating the ciliary body and exposing the vitreous humour.

Fig. 2.



neither should the counter puncture be in the transparent cornea; if a faulty puncture or counter-puncture be made, the point of the knife should be withdrawn and inserted in the desired position. The outer wound is almost altogether in the true sclerotic tissue while the inner is in the corneo-sclerotic junction. It happens sometimes that the point of the knife, after dividing the sclerotic, pushes the conjunctiva before it instead of piercing it, and the aqueous humour escapes into the bag of the conjunctiva; this circumstance should not alarm us, nor prevent the section being quietly completed, but when the knife has been cut out the conjunctival opening should be enlarged with a scissors down to the point of counter-punctuation. With the completion of the section terminates the first step of the operation; the forceps is then given to the assistant who draws down the globe, and the operator turns the conjunctival flap back over the cornea. The prolapsing iris being thus fully exposed, is seized in the iridectomy forceps near one angle of the wound drawn but very slightly forwards and cut through with a straight or angular scissors as close as possible to the corner of the wound; its ciliary attachment is then freed by a touch of the scissors or torn through by drawing the forceps with the iris in it to the opposite angle, where it should be divided also as close as possible to the corner of the wound. In quiescent patients with moderately prominent eyes I sometimes make the iridectomy without having the globe fixed. It is very important to remove the iris up to its ciliary attachment as completely as possible, especially at the angles, for otherwise it is very likely to prolapse, retard the healing of the wound, and give rise subsequently to a cystoid cicatrix, which is peculiarly liable to become irritable. It requires some little care also to avoid cutting the conjunctiva with the scissors; it should therefore be carefully turned down over the cornea before the iridectomy. On completion of this second step the globe is released by the assistant, and if there be no complication the third step that of opening the capsule is to be forthwith proceeded with. If there be hemorrhage into the anterior chamber from the iris or conjunctiva it should be removed before lacerating the capsule, gentle upward movements of a spoon or curette over the front of the cornea and slightly opening the wound will generally suffice to remove the blood. The laceration of the capsule seems to me the most difficult part of the whole operation and requires considerable dexterity and judgment. The operator fixes the eye, introduces the cystotome on the flat as far as the inferior border of the pupil where he gives the instrument a half turn, whereby its cutting sickle-shaped edge comes into contact with the convexity of the lens, and in this position he draws the instrument upwards and thus opens the capsule; it is well to make two cuts starting from one end and the same point inferiorly—the one directed upwards and inwards, the other upwards and outwards; an incision along the periphery corresponding to the section is also advisable. In this manipulation great care is to be taken not to displace the lens—a thing difficult to avoid in old cataracts with tough degenerated capsules. If the lens be accidentally disturbed it should be replaced *in situ* by a hook or curette, otherwise its faulty presentation to the inner wound will cause difficulty in its delivery. If there be adhesions of the iris to the lens they should be divided with the cystotome. The fourth and last step consists in the expulsion of the cataract; the fixation forceps is shifted to one side of its former position, the convex smooth surface of a caoutchouc or tortoise-shell spoon which will not injure the corneal epithelium is placed on the lowest part of the cornea and pressed against it in a backward and upward direction; this pressure causes the lens to start and should be continued steadily backwards until the lens is fairly in the wound, when the pressure should be directed upwards by gliding the spoon along the cornea, following the movements of the lens until the whole cataract has been expelled; should portions of the soft cortex be stripped off and remain in the pupil they are to be pressed out by the action of the spoon on the cornea and by opening the wound. If *there be any difficulty* in expressing the lens the posterior lip of the wound

may be slightly depressed while the pressure is continued below—an assistant fixing the eye; it is advisable at this stage of the operation, however, if fixation be necessary, for the operator to control it himself, as improper pressure might easily cause loss of vitreous. In the majority of cases of ordinary cataracts this pressure properly directed will suffice to express the lens; in some instances, however notably, where there has been much loss of vitreous or where the vitreous is fluid it fails, and we must then have recourse to traction instruments, such as hooks or spoons; v. Graefe's hook bent in the stem so as to adapt itself to the convex posterior surface of the lens is introduced on the flat, given a half turn and inserted into or beneath the lens and the latter withdrawn, or a spoon is made use of as in the traction extraction. Where the vitreous is known to be fluid we should remove the lens with the hook without having recourse to pressure. Before bandaging the eye we should satisfy ourselves as fully as possibly by testing the vision and otherwise that all portions of the lens have been removed; after taking the speculum away and allowing some time to elapse we should gently rub the upper lid over the globe by which means often small particles which had previously remained concealed behind the iris will come into view; these as well as pieces of capsule should be carefully removed as they are, if left behind, most likely to cause iritic complications and neoplastic formations; the time thus spent no matter how long should not be grudged or considered ill spent, for on the *complete* removal of the lens depends in a great measure the ultimate success. I am in the habit of testing the vision at this stage; in the ordinary cases where a cataract has been perfectly removed the patient should recognise and distinguish faces. All filaments of the blood and particles of lens are to be removed from the wound by means of a curette. In one instance of normal operation in which vision was as perfect as possible under the circumstances, a small clot of blood remained at the inner angle of the wound, and with a view of removing it I seized it with the iridectomy forceps as I had often done previously; at the very moment however the patient made a sudden movement with her head and I saw the iris stretching, and, before I had time to open the forceps, the ciliary attachment at its lower and inner side gave way and blood poured forth which quickly filled the anterior chamber; the reason of this was the fact that I had unawares seized in the forceps a piece of prolapsing iris which had been concealed by the clot of blood. I may mention that notwithstanding this serious and avoidable accident the patient after some months recovered very useful sight. The error I committed is instructive in several particulars—but more especially in showing how careful we should be to remove the iris completely at the angles of the wound; it shows also perhaps the necessity for having the patient's head held and steadied by an assistant during delicate operations on the eye; as a rule I do not adopt this practice in extraction, preferring to leave it to the patient's own sense not to stir, neither do I as a rule allow the patient to hold the hands of bystanders, as I think it conduces generally to spasmodic movements which would otherwise not take place; the trust and confidence reposed in the patient are usually responded to by quiescence. When the operation has been completed a piece of fine linen or muslin about 5'' × 3'' divided up the centre to the extent of about 2'' is placed over the eyes, the undivided portion on the forehead, the division being occupied by the nose, the hollows around the eye especially at the inner angle are then carefully filled up over the linen by cotton wool, and the cotton packed on so that its surface shall project beyond the level of the orbital margin and nose; over this is placed Liebreich's bandage and tied pretty tightly. By this means a uniform and equable pressure is kept up on and around the eyeball, and the bandage is so constructed that no movements of the patient's head can displace it, while it admits of being opened and reapplied and of the dressings being changed without disturbing the patient.—*Dublin Quart. Journal, May* 1870, *p.* 313.

72.—ON A NEW OPERATION FOR REMOVAL OF POSTERIOR ADHESION OF THE IRIS,

By Dr. ALEX. OGSTON, Ophthalmic Surgeon to the Aberdeen Royal Infirmary.

[Cases of adhesion between the iris and crystaline lens usually go on unfavorably when left to themselves, the adhesion becoming greater in extent, and having more and more tendency to produce iritis. In the end, the pupil becomes covered with the products of inflammation, and inflammation of the capsule of the lens interferes with its nutrition and leads to cataract.]

The treatment of adhesion between the iris and lens posterior synechia, as it is called, is one of the least satisfactory parts of ophthalmic practice. In the cases of iritis and corneitis, where these are so apt to be formed, the use of atrophine furnishes us with a means of preventing, in many cases, this annoying occurrence; but, in spite of the most careful treatment, adhesions often happen, and constitute a germ of mischief tending continnally to progress.

When the adhesions are broad and extensive, no better or surer means could be wished for than the performance of iridectomy, which radically cures the whole mischief at the expense of a slight deformity. When, on the other hand, the adhesions are few, and involve mere points of the pupillary margin, it would be greatly to be desired that we could break down synechiæ without producing deformity of the eye. The use of atropine commonly fails us entirely in such cases, and operation is the only means of attaining this end.

As a substitute for iridectomy in such cases, it has been proposed (Stellwag's *Augenheilkunde*, 1864, p. 179), to make a peripheral incision in the cornea with the usual iridectomy knife, then to introduce a peculiar flat hook, sharp at its concave side, and break down the adhesions by pushing with the convex side, or cutting them with the concave portion. It was hoped that this operation would succeed in an eye under the influence of atropine, but the proposal seems never to have found favor, and I am ignorant of what success, if any, is said to have attended it. The description of it would cause any experienced oculist to hesitate before even giving it a trial.

More recently (*Archivfür Ophthalmologie*, 1869) Dr. Passavant, in a letter to Professor von Graefe, suggests that limited adhesions of the iris to the lens should be broken down in the following manner:—The iris being under the influence of atropine, a peripheral incision, as for iridectomy, is to be made in the cornea opposite the site of the adhesion. The knife is then withdrawn, and an iris forceps is introduced, which, seizing the iris near the pupil, and at a point corresponding to the adhesion, is made to drag the iris outwards towards the wound until the adhesion is seen to rupture. The forceps is then loosed from its hold on the iris by opening the blades, and withdrawn, the operation being thus completed. Dr. Passavant usually contents himself with the destruction of one adhesion at a time, and operates upon another after an interval of a few days. He says —"In more than fifty such operations I have not met with a single injurious result."

This paper of Dr. Passavant appeared so honestly written that a trial of his method was instituted in the next case that presented itself in the Aberdeen Hospital. In this, as in all the cases where I have tried it, the operation was followed by no bad result as regards the iris; but, though the adhesion was seen to tear, the contraction of the pupil which invariably followed on the escape of the aqueous humour allowed the two ends of the adhesion to lie so close to each other that they united again in spite of the free use of atropine, and by the time the corneal wound was healed the same state of matters existed as before the operation, only the adhesion was not *so broad as* previously.

In both the above-mentioned operations the fault lies chiefly in their necessitating the escape of aqueous humour, and so permitting the contraction of the pupil which follows to bring the ends of the separated adhesions so close that they reunite. They show, however, with what impunity the iris may be manipulated, and that iritis is not even a usual result of careful and well-judged interference.

The following mode of operating on cases of limited adhesions for which iridectomy is too severe a measure is based upon two facts—first, that the iris is a structure sufficiently tough to resist very decidedly attempts to transfix it, and will be pushed before the point of a sharp instrument so as even to tear from its attachments rather than allow the sharp point to pass through it; and second, that if the aqueous humour be not permitted to escape, an instrument may be introduced into the anterior chamber, and the iris manipulated without causing contraction of an atropised pupil.

The pupil being put well under atropine, and the patient being under chloroform or bichloride of methylene, a spring speculum is fixed on the lids, and the operator fixes the bulbus with a pair of forceps held in the left hand. The situation of the adhesion is now well studied, and, if necessary, concentrated artificial light is employed to render it distinct. This latter, however, is necessary only with feeble daylight or opacities of the cornea. A needle is now introduced through the cornea, near its sclerotic margin, at a considerable distance on one side of the adhesion, and in such a direction that, when pushed onwards, it crosses at right angles that radius of the lens in which the adhesion is lying. The needle is pushed onwards into the anterior chamber, and so guided by the operator that its point becomes engaged in the pupillary margin of the iris at the root of the adhesion. The simple contact of the needle point with the iris is sufficient for this, and no attempt must be made to bury the needle in the tissue. By a gentle lever action of the needle point towards the periphery of the iris, the corneal wound being the fulcrum, the adhesion is broken down by being stretched and ruptured, and the needle being slowly withdrawn from the eye, the operation is completed.

There seems to be no reaction of iris or cornea consequent on this slight interference; on the contrary, I have found the dilatation of the pupil always keep the torn ends of the adhesion apart under the use of atropine until absoption had taken place.—*Medical Times and Gazette, May* 28, 1870, *p.* 579.

73.—ON THE OPERATION FOR ARTIFICIAL PUPIL.

By Professor Liebreich.

[The following is a translation of a note on the operation for Artificial Pupil, which was read by Prof. Liebreich before the Academy of Sciences at Paris,]

The advances made by modern ophthalmology have so greatly increased the number of indications for the performance of iridectomy, that this operation has become one of the most important in surgery. In fact, it is well known that it sometimes produces a therapeutical effect, at others an effect purely optical, whilst occasionally the two effects are combined.

Other operative methods for artificial pupil, such as iridodialysis and incarceration of the iris in the wound have been completely abandoned for several years. At the present day the operation consists invariably in the excision of a piece of the iris.

It is hardly necessary to say that the form and extent of the excised portion must vary greatly in each particular case, according to the effect sought by the operation. Thus, for example, when iridectomy is employed as the sole and powerful remedy against the various forms of glaucoma, and certain forms of irido-choroiditis, the excision of a large portion of the iris must be practised, including both the ciliary insertion and the

pupillary margin; in these cases, the aperture resulting from the union of the natural and artificial pupils assumes the form of a keyhole.

Should it be desirable, on the other hand, to obtain an effect solely optical—that is, to give passage to rays of light when the natural aperture of the pupil is obstructed, by a partial and stationary cataract for instance—it would be generally preferable to make a narrow artificial pupil, for the same reasons that, in optical instruments, have governed the adoption of diaphragms with narrow apertures.

In some other cases—for instance, in central opacities of the cornea, with adhesion of the iris,—it is frequently desirable to excise a large portion of the pupillary margin of the membrane, and only a narrow extent of its periphery. If on penetrating more deeply into the question, the individual cases in these categories be analysed, it is impossible not to recognize the fact, that it is very necessary to be able to vary the iridectomy at will in order to render it as useful as possible in each individual case. But hitherto we have not been in possession of the very desirable means necessary to accomplish this end. We are ordinarily incommoded by certain difficulties in the mechanism of the operation. We have not the freedom of action necessary in order to vary the shape and size of the iridectomy according to the urgency of the case.

In the usual operation, after having made an incision in the cornea, a small pair of forceps is introduced into the anterior chamber, with which the iris is seized and drawn out of the wound, and a portion of it excised. But it is the size and position of the incision in the cornea which almost solely determine the shape and size of the excision.

For the forceps, which should always be introduced in a direction corresponding to the radius of the cornea—that is, towards the pupillary centre,—are limited in their expansion by the extent of the aperture in the cornea. If the grasp of the forceps has not been sufficiently extensive, and the portion of iris excised consequently is too limited, this fault can rarely be corrected after the first attempt, because a repeated introduction of the forceps is fraught with danger to the crystalline lens, which is no longer protected at this point by the iris.

In order to avoid these difficulties, and render the shape of the artificial pupil more independent of the dimensions of the corneal incision, which it is not always possible to make of the size deemed necessary, it has seemed to me desirable to substitute for the ordinary iridectomy forceps an instrument which it shall be possible to introduce through a narrow opening in the cornea, and which nevertheless shall expand widely in the anterior chamber.

It was necessary that this instrument should be capable of being introduced in any desirable direction other than radial.

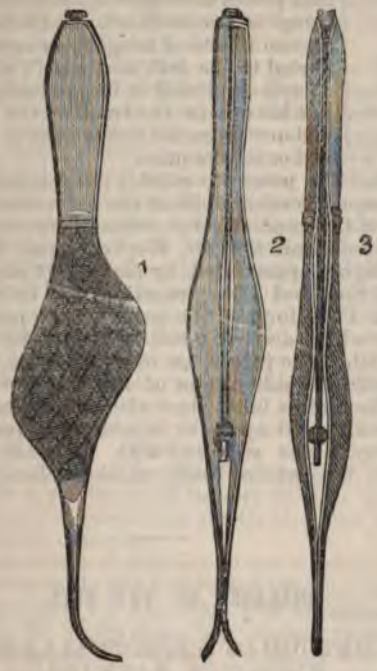
Starting from these practical considerations, I have invented a new form of forceps, answering completely all conditions requisite for iridectomy. The following is a description of the instrument:

The limbs of these forceps do not open in the ordinary manner, but turn round a longitudinal axis in such a way that their rotation alone suffices to open and close their curved extremities. The movement of opening and shutting takes place without the part of the instrument which is engaged in the wound participating in the least degree; this part of the instrument, on the contrary, remains closed when the extremities are expanded. The size of the wound plays no part in the mode of action of the instrument on the iris. As a result of this circumstance, the introduction of the instrument is not limited to a radial direction; it may take place in a series of other directions, all comprised in the extent of a segment of a circle of which the circumference is described by the curved extremities of the forceps taken as a radius, whilst the centre of the circle is the part of the wound in which the instrument is situated.

The application of these new forceps does not present the slightest difficulty. Holding them like a pen between the three fingers, they are opened by placing the index finger on the instrument, and closed by applying the *middle* finger.

The manufacture of the instrument is also sufficiently simple.

The principle on which the construction of these forceps depends has never been applied to any surgical instrument. I believe that this princi-



ple may be easily utilised for many other instruments; but I hope, above all, that it may render important services by perfecting the operation of iridectomy.—*Lancet, July* 2, 1870, *p.* 10.

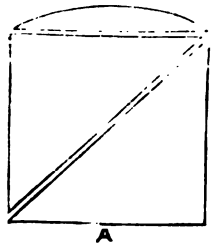
74.—ON A NEW FORM OF DEMONSTRATING OPTHALMOSCOPE.

By Robert Brudenell Carter, Esq., Surgeon to the South Royal London Ophthalmic Hospital.

[The following is a an account of a new form of ophthalmoscopic object-glass contrived by Dr. Wecker, of Paris, and Dr. Roger. It appears to be a valuable instrument for the purpose.]

It consists of a plane-convex object glass, behind which are placed two rectangular prisms, the whole combined in the manner shown in the diagram, and inclosed in a brass box, with a handle beneath, and with openings on three sides. It is used with a mirror, as a simple lens would be, for the production of the inverted image; and its action is to divide the

rays returning from the eye examined, into two portions, which follow drections at right angles to one another.



The examiner, turning the lens towards the eye of the patient, and inclining it a little obliquely, sees the inverted image in the ordinary way, from light that passes through both prisms, at the side A of the compound instrument. A bystander at the side B sees an identical image from rays that have been reflected to the left, and sees it without requiring to exercise any skill in its production. He has only to put his eye in the track of the rays, and at such a distance from the instrument as the state of his own vision may require.

I need not say that the power to exhibit the fundus of the eye, plainly and clearly, to a second person, while at the same time examining it oneself, will often be of the greatest value for the purposes of instruction and consultation; and I am sure that Dr. Wecker's most ingenious invention cannot fail to be highly appreciated by many. It may be procured from Messrs. Weiss and Son: but I may mention that, in the first instrument sent to them from Paris for me, the prisms were packed in the box in wrong directions, and the desired result could not be obtained until they were properly placed. The prisms are of crown-glass, the hypothenuse of each subtending with the side angles of 42° and 48° respectively. The plane surface of the lens is in contact with the adjacent prism, and the prisms themselves are held apart by morsels of velvet. Three lenses of different focal lengths are supplied with the case, and they may be exchanged without the prisms being moved.—*Lancet, June* 18, 1870, p. 870.

DISEASES OF THE SKIN.

75.—ON A NEW METHOD OF EFFECTUALLY REMEDYING THE EEFECT OF HARE-LIP.

By Dr. William Stokes, Jun., Surgeon to the Richmond Surgical Hospital, Dublin.

All operations hitherto devised and practised for remedying the congenital malformation called hare-lip, present two prime difficulties to the operating surgeon. These are, the getting rid, or at all events diminishing the chances of, the subsequent occurrence of two deformities, which occasionally in truth but too frequently occur, after even the most skillfully performed operation, and for the avoiding of one of which, at least, as is well known, many and various plans have been recommended. The deformities I allude to are—first, the occurrence of a notch on the red border of the lip at the lower termination of the cicatrix, which, though not an invariable is a most frequent defect; and secondly, the vertical groove, which in nearly all cases hitherto operated on, exists to a greater or less degree, and which is produced by the contraction or falling in of the tissues at this situation. For this defect, when it occurs, there is, I may say, absolutely no remedy. To rectify the first of these, the occurrence of the notch, namely, no insurmountable difficulty presents itself to a surgeon of ordinary ingenuity and dexterity. It is unnecessary to allude to what has been done in this direction by Langenbeck, Malgaigne, Samuel Smith, of Leeds, and many other eminent operating surgeons, as their recommendations, as well as those of other distinguished operators, are doubtless already sufficiently well known to all practical surgeons. But I feel confident, that all who are possessed of experience in such cases will bear me out in stating, that the formation of a notch is a sequela which, if possible, *should* be avoided by all the means in our power, no matter how dex-

terously and expertly the operation may have been performed, its occurrence is the rule and not the exception. With regard to the second deformity I have spoken of, the vertical groove or sulcus, namely, it is notorious that hitherto no attention has been directed to its avoidance. It has long appeared to me that an operation which would efficiently get rid of the chances of both of these defects supervening, should be devised, and that if such were found possible, there would be then left, in dealing with the deformity of hare-lip, nothing to be desired.

To attain these objects the adoption of the principle of the utilization of the parings appeared to me to be essential. The operations, in which this principle has as yet been either in part or entirely adopted, are those of M. Nélaton, of Samuel Smith, of Leeds, and of my late valued friend and colleague, Mr. Maurice Collis. These procedures, however ingenious though they be, appear to me to possess certain defects. The defects of M. Nélaton's operation appear to be that, while it utilizes the parings, it leaves in the ordinary situation of the notch a projection so great that a subsequent curtailment of it becomes a necessity. Secondly, it does not get rid of the vertical groove caused by the falling in or contraction of the tissues at the line of the cicatrix; and lastly, it is only capable of being adopted in cases where the labial cleft is extremely limited.

Mr. Collis' operation, ingenious though it be, is an extremely complicated procedure, and, in my opinion, possesses two other disadvantages, which are, the necessity of turning up the upper portion of the flap, attached to the ala nasi, which includes the entire thickness of the lip, and fastening it to the upper portion of the mesial flap, which does not comprise all the tissues of the lip. This turning up of the upper portion of the alar flap must obviously be accompanied by great constriction of its vessels, and the part must therefore be very liable to perish; and again, when this does not occur, a puckering at this situation takes place, which is in itself a considerable deformity.

But there can be no doubt that surgeons are much indebted to Mr. M. Collis for having prominently put before them the importance of utilizing the parings in operations for hare-lip. The operation known as Malgaigne's or Sédillot's, Mr. Collis states he "learned twenty years ago from a fine old English surgeon, Mr. Samuel Smith, of Leeds. He told me then that he had devised it some twenty or thirty years previously. Whether he ever published it I do not know. This improvement consists in removing the lower portion of the paring, at each side, and turning them downwards so as to form a prominence along the margin." (Dub. Quart. Jour., May., 1868.)

The steps of my operation may now be briefly stated. I may mention, in passing, that the complete incisions, or those through the entire thickness of the lip, are indicated in the accompanying diagram by black lines; the others, or those, which do not go through the entire lip, are indicated by dotted lines. Having either removed the pre-maxillary bone (should it be displaced, which is the plan advocated by Mr. Adams) or placed into its normal situation, which can be done either by pushing it back immediately with a broad pair of forceps slightly curved, the opposing surfaces of the blades being covered with soft chamois leather, or if the projection be too great, by first removing a V-shaped piece of the vomer, as first, I believe suggested and practiced by Professor Lungenbeck, of Berlin; or again, by adopting the plan of Boyer, of making for a considerable time previous to the operation a firm and steady pressure on the projecting bone; I then, with a curved scissors, divide all the false frena. I quite aggree with the views held by the late Mr. Collis, as to the importance of preserving the true fernum, "its obvious use is to steady the lip, to prevent muscular action from drawing the centre of the lip away from its proper place." Again, he remarks—"The division of the frenum unsteadies the lip, makes it tend to run into a string, and in many cases leaves a permanent fistula into the nostril. It is, moreover, quite unnecessary, as the parts can be brought into perfect apposition without meddling with it." I

should mention that previous to any cutting with either scissors or knife, in order to get rid of the great annoyance of hemorrhage, which in young subjects is a matter of grave moment, and in all cases, when it occurs seriously, interferes with the comfort of the operator, I invariably apply at each angle of the mouth one of the largest of the late Mr. Nunneley's artery forceps, and in all cases I have found that it effectually commanded the hemorrhage. Another advantage of these truly practical instruments at this stage of the operation is, that they enable the operator to dispense with the aid of assistants pressing with their fingers the lips in these situations, and of necessity impeding the operator to a greater or less extent. The forceps having been applied at each angle of the mouth, I seize the edge of the cleft at its lower extremity with a double hook, draw the parts forward, in order to put them on the stretch, and with a fine narrow-bladed knife (Graefe's knife, for the new modified linear extraction operation, or a fine Pollock's knife, answer the purpose remarkably well,) I make an incision through the entire thickness of the lip, taking care, however, to stop at about two or three lines above the red border of the lip. I then make another similar incision on the opposite side. Two *serres fines* must then be applied to the extremities of these flaps, which have the two-fold advantage of arresting any hemorrhage, however slight, that may occur, and also by their weight making the flaps hang down below the red border of the lip, thus keeping them out of the way of the operator until the time comes by uniting them by a point or points of interrupted suture.

The two points, *a* and *a'*, can thus be brought down below the red border of the lip, thus forming a projection, and effectually getting rid of the subsequent occurrence of a notch in this situation. The next step of the operation consists in making a vertical incision (KB) through the entire thickness of the lip, with a small straight scissors at the upper angle of the cleft. This, of course, is only necessary in cases where the labial cleft does not extend into the nose. The making of the partial incisions at the edge of the cleft on either side, constitute the third stage of the operation, and for these the knives that answer best are either Graefe's cataract knife, a straight iridectomy knife, or Pollock's knife. These incisions are made going through fully two-thirds or three-fourths of the thickness of the lip from the upper point of the vertical incision K down to *b* on one side, and from K to *b'* on the other. Great care should be taken to prevent the knife going too far and wounding the mucous membrane of the lip. The two quadri-lateral flaps (K B *a b*) and (K B *a' b'*) united behind by the mucous membrane of the posterior aspect of the lip, can then with great facility be turned back, and the broad raw surfaces of each brought into apposition. A tolerably strong well tempered spear-pointed needle should then be introduced from *b* to *b'*. In the great majority of cases one is sufficient. A second may, however, be introduced higher up, and the raw surfaces of the quadrilateral flaps approximated by an ordinary figure of eight suture. When, however, a second needle is not deemed necessary, the edges can be approximated and

held together by fine entomologist pins, the introduction of which into surgery, from their being so singularly unirritating, is a real boon. For the point of suture below fastening the points *a* and *a'* the fine Chinese suture silk, which can be obtained from M. Lüer, of Paris, can be used with great advantage, as it is, of all the substances I have used for this purpose, the least irritating. Formerly, following the recommendation of Mr. Maurice Collis, I was in the habit of using largely horse hair for interrupted sutures. It is certainly a substance which when introduced into living tissues gives rise to little or no irritation. But notwithstanding this, I am not now as warm an advocate for it as I once was, in consequence of it being occasionally so brittle. For, in truth, I cannot but look on it as a very unfortunate circumstance, having, on a suture breaking, to re-introduce another needle and suture.

As yet I am unable to give more than the particulars of three cases in which I have practised this method of operating; but from the results I have obtained, a good idea of which can be got from the accompanying wood-cuts, I may, I think, fairly claim to have succeeded in attaining the two prime objects I had in view in setting out, which were, to get rid of all chance of the subsequent occurrence of the two defects which, as I stated already, so frequently supervene after the operation for hare-lip; namely, the notch at the red border of the lip and the vertical sulcus or groove corresponding to the line of the cicatrix. The chances of this latter defect occurring are rendered simply impossible, in consequence of the great breadth and thickness of the opposing raw surfaces; being, as they are, double the thickness of any other portion of the lip. The plan which I have adopted for preventing the formation of a notch also gets rid of the chance of that defect subsequently occurring. By operating in this way, therefore, we get rid of all the defects of the other procedures, in which, in part or entirely, the principle of the utilization of parings has been adopted. For—

First—No subsequent curtailment of the projection at the lower extremity of the cleft is necessary.

Second—The procedure is applicable to all forms and varieties of hare-lip.

Third—There is no chance of portions of the soft tissues perishing from any twisting of them.

Fourth—There can be no subsequent puckering.

Fifth—There can be no subsequent notch.

Sixth—The possibilty of any vertical sulcus or groove in the line of the cicatrix is also prevented, which is the case after Sédillot's, Malgaigne's Samuel Smith's, and, in truth, all other operations hitherto devised for remedying the defect of hare-lip.

[Dr. Stokes prefers to defer operating until after the period of dentition, principally on account of the weak, soft, and pulpy nature of the structures in the earliest period of infancy, and the bad effect of hemorrhage upon the system at that age.]—*Dublin Quarterly Journal, Aug. 1870, p.* 1.

76.—ON THE TREATMENT OF BURNS.

By Frederic C. Skey, Esq., C.B., F.R.S., Consulting Surgeon to St. Bartholomew's Hospital.

[The treatment usually adopted in burns, viz., carron oil and cotton wool, affords no relief to the acute sufferings of the patient. The patient recovers certainly, but we want recovery along with the least amount of suffering.]

The principle I am anxious to insist on as far preferable to any involved in the carron oil treatment is exhibited in the results of the application of heat to any small burn on the hand, as from a drop of melted sealing-wax. The very smart pain occasioned by this trivial accident is entirely relieved

by immersing the hand in hot water, or by holding the hand to the fire for a few minutes. If this be a fact—viz., that by the brief application of an agent promoting pain (for *heat* is not essential) one important element of the injury, that of pain, is quickly relieved,—there must be some virtue in the principle involved. And there is a virtue, and a very important one; for I maintain, from many years' experience in the treatment of burns, that not only is the pain far more quickly relieved, but that the cure is hastened in the same proportion.

Some half a century since this principle of treatment by local stimulants was enunciated to the profession by Dr. Kentish, of Bristol. Its value was at once acknowledged by observing men; and I think I am not mistaken in asserting that the principle was adopted in the majority of the hospitals of the metropolis, if not in all. I know that it was thoroughly appreciated by my own teacher, Mr. Abernethy, who would naturally influence the opinions of a considerable proportion of the profession. The agent employed by Dr. Kentish was spirit of turpentine, which was applied, diluted or otherwise, over the affected surface. The application was accompanied by an increase of temporary pain, which, however, passed off in the course of a few hours, and thus improved the condition of the patient. The amount of pain was in relation with the extent and severity of each injury. How it has happened that we have reinstated the fomentation and carron oil system again I know not. I don't understand how a surgeon who has once adopted the application of treatment by local stimulants could abandon them for a negative principle of oils or warm water. I wish to recommend to your recollection the employment of a remedy on the same principle I have for many years resorted to both in St. Bartholomew's Hospital and elsewhere—viz., a solution of nitrate of silver in a proportionate strength to the extent and severity of the burn. I have used the solution in the strength of from five to twelve or more grains to the ounce of water. The lotion would, of course, be modified by the age of the person, five grains, or about five, sufficing for a child. If the whole surface be freely bathed with the solution, and entirely covered up in cotton-wool, and a moderate opiate be administered in a glass of brandy-and-water in strength proportioned to the age and habits of the patient, with the object of counteracting the sense of chilliness that will otherwise necessarily follow in all these cases, I think you will find you have made a good start in the future management of your case. In all cases, whether of burn or scald of the external skin, I say, resort to local stimulants. The soft and soothing system, I believe, answers no useful purpose whatever beyond that of excluding air, if that be, as supposed, a great desideratum.

I prefer the solution of nitrate of silver to the turpentine of Dr. Kentish, because it can be made of variable strength to suit each individual case, and the relief it affords after its first application is yet more complete than that afforded by the latter remedy. The theory of the excellent results of the treatment of burns by provocatives, or remedies that provoke physical pain, is not very clear. It would appear that relief invariably follows a temporary increase of pain; but one is inclined to ask whether the benefit consists in the actual presence of pain, and how far the same agency—whether of fire, hot water, turpentine, or the nitrate-of-silver lotion—would be equally beneficial when the subject of the injury was placed under the influence of chloroform. This question I must refer to others more fortunate than I in having at their command a larger field of inquiry than now falls to my lot.

My advice to you is, to abjure carron oil and all demulcents, and to adopt the treatment of burns and scalds by local stimuli.—*Lancet, August* 27, 1870, *p.* 285.

77.—ON CICATRICES FROM BURNS.

By Frederick C. Skey, Esq., C.B., F.R.S.

[Cicatrices from burns occur chiefly in the regions of the face and neck, the axilla and the elbow. The distortions produced as is well known are sometimes frightful.]

With a view to remedy these evils, I have on several occasions resorted to the Taliacotian operation; dividing freely, and dissecting off the morbidly contracted skin, and replacing it by sound skin from the neighborhood. But, on the whole, the treatment has failed. It is sound in principle, but my experience would not, in my hands, justify the future resort to it; either the reunion of the apposite surfaces has failed, or the new integument has sloughed, or some other untoward circumstance has occurred to mar the success of the treatment.

For several of the latter years of the tenancy of my office of surgeon to the hospital, I adopted, in these and similar cases, a new principle of treatment far more efficacious than that I have described. This principle requires a few words of explanation. If you observe the healing progress of an ulcer, be it where it may, you will not fail to notice the gradual declension of healing power the wound exhibits as it advances, so that an ulcer of four inches diameter requires for the last inch as much time to heal the entire wound as has been occupied in the healing of the previous three inches. It would appear that the curative or healing action became exhausted and the progress towards complete cicatrisation in the same degree retarded. It is this tardy progress in the healing process of wounds that explains the condition of these singular cases, and renders them so difficult of control. Almost every description of open wound, as you well know, heals from the margin. There are exceptions to this natural law in the case of old phagedænic ulcers, in which an island of cicatrisation forms in the midst of the granulations; but I do not recollect to have seen this feature in any common wound. The healing power of a wound is in a relation with the extent of its margin, a wound of four inches square having a healing margin, and therefore a healing power, of 16 inches. Divide this wound into four, of one inch each, and you have a healing margin of 64 inches. Again divide it, in theory I mean, and you have a margin of 128 inches. Now, if the fact I have stated be true, that the healing process of wounds is retarded at every step it takes, you will readily see that the smaller the wound the more rapid the healing process; and, if instead of one large wound, you make twenty small wounds, the healing process is completed with great rapidity, and the evils attendant on these large cicatrices may be removed by very simple means—viz., the relaxing the tension caused by these bridles by making a large number of small divisions of the cicatrix instead of one large one. Carrying into execution this principle, I have treated these cicatrices by small incisions in various parts of the body for some years. In my first case, in which the thumb of an indoor patient was attached to the index finger, which had resisted various efforts to permanently dissever it, I fixed the thumb in full abduction by some slight mechanical agent, and then made about eight to ten incisions through the skin and subjacent tissue, each incision not exceeding eight or nine lines in length, In ten days the man had perfectly and permanently recovered the entire use of his thumb. I then adopted the principle on a larger scale in the neck and at the elbow joint, and I am quite satisfied of its soundness. I believe the smallest possible margin to each wound will suffice for the cicatrising process, and the incisions should be made with all caution that they do not run into each other.—*Lancet, September* 17, 1870, *p.* 395.

78.—ON THE TREATMENT OF ENLARGED LYMPHATIC GLANDS.

By Furneaux Jordan, Esq., Birmingham.

[The following is an abstract of Mr. Jordan's paper read at the meeting of the British Medical Association at Newcastle, in 1870.]

The numerous modes of treating large glands are remarkable chiefly for their want of success. The method I now propose, if carefully carried out, I have never known to fail. The ordinary enlargement of lymphatic glands is due to inflammatory action. By far the most efficient remedy in inflammation of any organ is counter-irritation, if only it be established in the *proper locality*, and to a proper extent. A blister will cure bursitis when nothing else will, and inflammation of a bursa does not differ from other inflammations. In enlarged glands, as in abscess, carbuncle, boils, and erysipelas, the best locality for counter-irritation is *not over* the inflammation, but around it or adjacent to it—in short, in an independent vascular region. In enlarged cervical glands, a large patch of iodine irritation at the back of the neck, which may be prolonged below the glands, will certainly prove successful in a short time.

A shot bag, as heavy as can be tolerated, should be applied over the glands at intervals during the day, the patient being for this purpose in the horizontal posture. I might cite many cases. One, a representative one, under the care of an impartial and competent observer, will suffice. Dr. Hickinbotham, of Nechells, had under his care a man with enlarged cervical glands, which, for three years resisted the careful trial of every known treatment. Dr. Hickinbotham then, adopting my views, established a patch of counter-irritation at the back of the neck. In three weeks all enlargement had disappeared.

One of the advantages of counter-irritation is this—it gives certain and immediate relief to pain. The persistent tormenting pain of a carbuncle, for instance, may be instantly relieved by a ring of counter-irritation with its transitory smarting.

79.—ON THE TREATMENT OF HERPES CIRCINATUS BY LOCAL ASTRINGENTS.

By Dr. Charles H. Robinson, Demonstrator of Anatomy to the Ledwich School of Medicine, Dublin.

[The treatment of herpes circinatus by local astringents generally answers all the purposes necessary, without constitutional or other medicines being required. The most suitable astringent applications are tincture of perchloride of iron, sulphate of copper, and tincture of iodine. The following are a few cases illustrative of this treatment.]

Case 1.—14th February. Charles F., aged 15, I saw this morning with a cluster of herpes circinatus on forehead and behind left ear, circular in shape. Each spot touched with iodine tincture. 15th. Iron tincture applied to each spot; itching less. 18th. Sulphate of copper used. 20th. The spots on forehead and behind left ear are gone, but two fresh patches have appeared—one at angle of mouth, the other on left cheek. The sulphate of copper was daily applied, and on the 24th he was cured.

Case 2.—16th March. C. B., aged 17, I saw with a herpetic patch (crescentic) under one axilla; applied sulphate of copper to it. 19th. Same treatment continued. Several smaller patches have appeared, some on back of neck, others in axilla; tincture of perchcoride of iron to each spot, and on the 23rd March he was free from them.

Case 3.—8th April. James T., aged 25, came to me with four patches of *herpes circinatus* on right fore-arm; tincture of percloride of iron applied

to each. 10th. Itching gone. 13th. Several new spots have appeared. On the 18th of April he was cured.

Case 4—4th May. I saw James Y., aged 15, with several spots of herpes circinatus on right side of upper lip and on the chin; tincture of iron applied. 5th. A great number of spots have appeared since yesterday; to use zinc ointment twice daily. 6th Face covered with the eruption, spots between the eyes, on forehead, cheek, chin, &c. 8th. Used the perchloride of iron instead of zinc ointment; on the 13th May cured.

Case 5.—5th May. Charles F., aged 16, came to me with three herpetic spots on left cheek; applied sulphate of copper to each. 7th. Several new patches have appeared; opened each vesicle as it appeared, and touched the centre with bluestone. 8th. Another patch on left shoulder; tincture of iron applied to each. 10th. Two new spots on right hand; tincture of iodine to each. 12th. Cured.

Case 6.—24th August. Edward Q., 28 years of age, I saw with a herpetic patch, size of half-a-crown, on right arm, another smaller one on left arm; tincture of perchloride of iron applied. 26th. Itching gone. 27th. Tincture of iodine used. 30th. Another spot, size of a five-shilling piece, on back; same treatment was used, and on the 4th of September he was cured.

It will be seen from this that the result of the astringent treatment was as follows:—Case 1 lasted ten days; Case 2 seven days; Case 3 ten days; Case 4 nine days; Case 5 seven days; Case 6 ten days; making an average duration of less than nine days each, which, considering the nature of the cases, all being of relapsing kind, I believe to be very favorable.

It may be remarked that although herpes circinatus is a disease essentially of youth; yet two of the above cases were in adults—one aged 25, the other 28 years of age.

I may mention that all these patients were inmates of the same institution, being under the same hygienic and dietary arrangements; but how it originated I am unable to say. No special cause can be assigned for it: sometimes, according to Cazenave, it is supposed to be produced by cold, or by the application of irritating lotions.

That herpes circinatus is contagious, is, I believe, now generally admitted, although formerly denied by some eminent dermatologists, Cazenave among the number. That the above cases prove its infectious powers I do not affirm; still I think they give rise to a strong suspicion that such was the fact, especially when it is remembered that they were all in constant communication, using the same towels and washing appliances, and therefore very liable, if it was contagious, to take it from one another. —*Practitioner, July* 1870, *p.* 24.

80.—CASES OF SKIN GRAFTING.

[The following is from the *Lancet* Reports of Practice in the London Hospitals.]

Mr. Francis Mason, at the Westminster Hospital, has performed the operation of skin grafting on granulating surfaces in nine instances. Five of these cases are now under observation.

The first was that of a girl with the cicatrix of a burn in the neck, of which a separate and detailed account will be given on another occasion.

The second was that of a woman who for three years had had an ulcer on the leg, measuring about four inches by three. Three pieces of skin, of the size of a canary seed, were snipped from the front of the upper arm, and simply placed on the ulcer, and retained in position by means of a strip of transparent plaster, made by Ewen of Jermyn Street, and over this water-dressing and a bandage was applied. At the end of a month the ulcer had nearly healed, each of these pieces having in a fortnight attained the size of a fourpenny-piece.

The third case was that of a man with a flabby-looking ulcer, as large as the hand, situated in the groin. Four small pieces from the front of the upper arm were grafted. Three failed to grow, and the fourth, after one month, was only of the size of a pea.

The fourth subject was a woman with an unhealthy ulcer of the leg, extending nearly all round the limb. Four pieces were grafted, and they all failed to grow.

The fifth, a woman, with an ulcer of the leg, of four years' standing, and two by three inches in size. Two pieces of skin were grafted, and in three weeks measured each a quarter of an inch in diameter.

The sixth, a man of middle age, with an ulcer of the leg, four by three inches in size; of nearly four years' standing. which was sloughing at the time of admission. Charcoal and linseed poultices were first applied, and the wound soon showed fairly healthy granulations, on which four pieces were grafted; and on the strips being removed four days later, they were all found to have adhered. When seen eleven days after the operation, they were spreading rapidly.

The seventh, a girl, aged 20, with a flabby ulcer on the thigh, of eight months' standing. Two pieces were grafted with good result.

In the eighth and ninth cases there were smaller ulcers, in which one piece only was grafted. They rapidly recovered.

Mr. Mason, without committing himself to a decided opinion on this interesting operation, believes that its success depends on the ulcer being, if not in a healing condition, at least of a healthy character. He had understood from Mr. Pollock who first showed him the operation, that the grafted portions often disappeared for a time, and were, as it were, reproduced in the course of a few days. Mr. Mason has never noticed this phenomenon. In his successful cases the grafted pieces have, on the contrary, never faded away or diminished, but remained centres of centrifugally spreading growth. They have in some instances assumed, in the course of a few days, a cupped or depressed appearance, as if a kind of very superficial ulceration were proceeding; but they have ultimately filled up again, and the process of healing has proceeded. The pieces of skin have only disappeared in cases where they have perished. The situations most favorable for this procedure are, Mr. Mason thinks, those where—as in the case of ulcers of the leg—pressure can be readily applied, so as to keep the grafted skin permanently fixed for three or four days.

Perhaps the difference between the results of Mr. Mason's experiments and those of other operators, as to the disappearance of transplanted skin, may be accounted for by the rather larger size of the portions (picked up in ordinary dressing forceps) which he cuts off.—*Lancet, Oct.* 22, 1870, *p.* 566.

81.—RADICAL CURE FOR CORNS.

We are glad to find a radical cure for these torments of civilized life, suggested by M. de Pontevés. It consists of the destruction, both of the cutical cuirass and the underlying cutis. The surface is covered with a vesicating plaster well charged with cantharides powder. After leaving this on twenty-four hours the cuticle will be found raised all around the "cuirass" of the corn; this is now taken off and a coating of tannin laid on the exposed and tender surface, then a tannin ointment laid over the part, the rationale being, firstly, the destruction of the cuticular covering, and then the application of tannin to the gelatinous cutis—in fact, "tannin the corn."—*Medical Press and Circular, April* 20, 1870, *p.* 319.

82.—PROPOSED METHOD TO PREVENT PITTING AFTER SMALL-POX.

By JAMES STARTIN, Esq., Senior Surgeon to the Hospital for Diseases of the Skin, Blackfriars.

The fearful epidemic of small-pox now raging in Paris and elsewhere, inclines me to bring forward a former suggestion of mine to prevent the "pitting" consequent upon this frightful disease, where it exists in a moderate and not in the virulent and lethial forms. This plan was published several years ago; but, for the obvious reason that my practice is chiefly confined to the treatment of chronic diseases of the skin, I have had few opportunities of verifying it by experience, although whenever a chance has occurred for doing so, the expedient referred to has seemed to have accomplished the end anticipated. I would preface my suggestion by the mention of two axioms which have guided me in its proposal. The first is, that it is the characteristic of small-pox to form a slough under each individual pustule; the second, is an affirmation by John Hunter, that two similar diseases cannot co-exist in the system at the same time. "For example," he states that "if yon can succeed in changing the nature of an inflammation, you can often cure the original complaint." Blistering in erysipelas, and Higginbottom's method of vesication with nitrate of silver, are familiar illustrations of this Hunterian law. The plan which I have proposed with the above ends in view is, as soon after the precise nature of the small-pox eruption becomes manifest, to blister, by means of a small camel's hair-brush each individual pustule, with the ordinary vesicating liquid of the Pharmacopœia, or with the "liquor vesicatorious," made by Bullen, or with the blistering caustic of the Skin Hospital Pharmacopœia. The face should be previously washed with a little pure ether, or with rectified spirit of wine, to remove any secretion from the skin which might interfere with the action of the blistering fluid. When the parts required have been painted over with the vesicator, and the skin, by turning white, shows that the blister has taken due effect, the pustules, or, if the eruption be confluent, the face should be varnished over with flexile collodion made after the plan I originally suggested: viz., by adding clarified neat's-foot or lard-oil to the collodion, instead of castor-oil, as directed in the British Pharmacopœia. This, it will be found, forthwith allays the pain of the blistering, and at the same time limits its effect to the circumscribed point to which it has been applied, which should hardly if at all exceed the apex of the pustule in extent.

It may here be useful to mention that flexile or elastic collodion has these singular and marked effects, not only in the instance now alluded to, but also in the case of burns, and scalds, even with the strong mineral acids, so that I have constantly treated such injuries from the action of nitric acid, or from gunpowder, etc., by this method of varnishing with elastic collodion, or where the skin has been broken, by first covering the part with blotting-paper, soaked in glycerine and water, to imitate the cuticle, and then varnishing with the flexile collodion, which procedure I have found, as in the case of small-pox, not only prevents the dreaded slough, but also promotes the healing of the part without mark or scar, and this in a shorter time than by any other method of dressing with which I am acquainted. But to return to the case of small-pox: after the blistering and collodion has remained intact for eighteen or twenty-four hours, a lotion, compound of starch and glycerine, plasma, as it has been termed, or glycerine jelly, may be applied two or three times a day by means of a flat camel-hair brush, so as thinly to cover the part and exclude the atmosphere and its drying effects.

Although I have mentioned the early periods of the eruption of small-pox as most advantageous for the prophylactic treatment indicated, yet it may be applied (of course with less chance of success) at any time during the eruption, except at the last or sloughing stage.

I could mention a few instances in confirmation of the advantages of this plan; but I will cite one only, the case of a Miss N., the daughter of a late physician. This young lady had several pustules of small-pox, on the face and neck, as well as elsewhere. All those within sight were blistered and collodionised, save one near the ear, which was left by the wish of Dr. N. to test the process. In every case where the blistering was applied no mark of pustular slough remained; but on the selected spot, as on a few other places which were overlooked, there were most evident signs of the disfigurement of the disease, the marks of pitting remaining until this day.

It would be a source of much gratification to me if any of my *confreres*, either in this country or Paris, whose opportunities are greater than my own, would make trial of the foregoing method, and favour me or your readers with the result.—*Brit. Medical Journal, June* 18, 1870, *p.* 623.

SYPHILITIC AFFECTIONS.

83.—ON THE USE OF SARSAPARILLA IN SYPHILIS.

By Dr. T. Clifford Allbut, F.R.S., Physician to the Leeds Infirmary.

One of the most curious examples of a rise and fall in popularity is the present estimate of the use of sarsaparilla in syphilis, when compared with the estimation in which it was held some years ago. The specific virtues of few drugs have been so highly vaunted as this supposed virtue of sarsaparilla; scarcely any drug in the Pharmacopœia is now so much neglected. It has been a matter of reproach to us that medicines praised one day are despised the next, and the reproach is not, perhaps, without justice. In some instances drugs are discarded for good reasons; they are, and deserve only to be, the invention of a day. In other instances, as may be the case with acupressure or with carbolic acid in surgery, success depends upon a number of conditions which it is difficult to unite, and methods of treatment fall into disuse on account of some complexity in the conditions of their use rather than on account of any worthlessness in themselves. The adoption and disuse of sarsaparilla, however, have no such excuse as this; the revelation of its virtues is to be had with little trouble and under simple conditions, and its disuse has been due only to a curious result of routine. The fact is, the antisyphilitic effects of sarsaparilla depend upon the dose in which it is given. Because decoctions and infusions are supposed, in all well-regulated prescriptions, to be given in the quantities of two table-spoonfuls three times a day, so sarsaparilla was supposed to be no exception to this arrangement, and in doses of one ounce it was accordingly given. I myself was a victim to this routine, until my attention was drawn to its use in the practice of my late friend and colleague Mr. Samuel Smith, so long the eminent and successful senior surgeon to the Leeds Infirmary.

Mr. Smith gave the remedy in doses of one and two pints a day, and with great success. So convinced were his colleagues of the value of sarsaparilla when administered in adequate doses, that I believe I am at liberty to say that many of them still find in large doses of this drug one of their best remedies. The only excuse I have for bringing the subject forward is, that the treatment has been in use for a quarter of a century at least in the Leeds Infirmary, and no one has yet published the results. I may add that, as I have formed a special class for diseases of the skin, so it may be that the antisyphilitic remedies have been more needed in my practice on that account. It is only as a follower of others, however, that I can speak on this subject at all. The remedy is used by us as a decoction, which is made in the infirmary in large quantities. Of this decoction, which differs only in unimportant details from the compound decoction of the Pharmacopœia, we administer from four to ten ounces three times a

day, or prescribe some such quantity as a pint or a pint and a half to be taken at will during the twenty-four hours. This medication is expensive no doubt, but that treatment is the cheapest which most quickly cures the patient. The cases in which sarsaparilla is most useful are cases in which the system is thoroughly infected with syphilis, during the tertiary and visceral modes of its appearances.

In persons who are in a thoroughly cachectic state, who have lost flesh and strength, and who are suffering from sluggish ulcerations and indolent gummata, the sarsaparilla is really of very great value. I believe there is scarcely a practitioner among my readers who will not rejoice to hear of a remedy which will help him to cleanse and to re-establish old syphilitic patients—patients whose constitutions have been undermined by want of nourishment or by excesses, who have gone through many courses of mercury, whose irritable mucous membranes will not bear any more iodide of potassium, and who are so sallow, so worn, so broken down, so eaten up by disease as to seem fit only for the grave. These persons clear up on such quantities of sarsaparilla as I have named, and it is here that the drug fills so important a gap. It need not, and it will not, supersede mercury and iodide of potassium in straightforward cases, but it has its place where these means have failed, or where they are on some grounds to be avoided. How far we are right in claiming this important place for sarsaparilla can only be known after an extended use of the drug according to our method by the profession at large. No array of my cases can do more than illustrate my opinions, and one or two instances will do this as well as a score.

Take, for example, the following: —— is nominally a laundress, and by practice a prostitute. She is evidently worn down by excesses and irregularities, and will soon be worn out. Her face is sallow and wan, her frame is wasted, her voice is hoarse, her hearing is dull. She has enlarged hard glands in her neck and groin, scars at the angles of her nose and mouth, coppery tubercles about the forehead and eyebrows, a lump of gummous matter in the calf of the right leg, nodes on her tibiæ, and open ulcers on her face and upon her legs. These ulcers are large, numerous, indolent, and characteristic. She makes no secret of her disease, and dates its origin several years ago. She "has had mercury," and her gums bear the traces of it; her irritable tongue and stomach, her anorexia, and her wasting seem to warn us against the iodides. She took sarsaparilla, beginning with half a pint a day, and increased the dose to one pint daily. On this treatment her complexion cleared, the ulcers contracted and healed, she gained flesh and appetite, and in two months she was restored to something like good health. On account of the expense of the drug I often wished to change it for the iodides of iron and potassium, but having found the benefit of the sarsaparilla she begged me not to omit it, and recognised its virtues with the greatest gratitude. This girl was an out-patient, and therfore placed under no new conditions of food or rest.

The next patient whose case I will relate is now an in-patient, but I took her from a gentleman's house, where she was much valued as a servant, and had been living with every comfort. I took her in on the 5th of Feb. last, and drew general attention to the case and its treatment in order to test the drug once more for the purposes of this paper. The girl on admission was worn, wasted, and sallow; she had coppery tubercles about both eyebrows, about the alæ nasi, and the right angle of the mouth. Her hair was thin, and her scalp tender, and she had nocturnal pains. On the left cheek over the zygomatic process was a soft gumma about the size of a cob-nut. She dreaded its breaking upon her face, for such lumps had formed in the flesh of her arms and legs, and had burst, giving rise to large ulcers. She was now infested by such ulcers, so as to present a pitiable object. They were on both legs, both above and below the knee, and presented the characteristic punched-out appearance of syphilitic ulcers. They varied in size from that of a shilling to a crown-piece, and there were perhaps seven or eight of them on the two legs. She had been

under medical treatment for some time before admission. I ordered her four ounces of decoction of sarsaparilla three times a day, intending to increase it to six ounces. The increase was, however, unnecessary, for she began quickly to improve in complexion, to gain flesh and strength, and to take food. Coincidently with this the ulcers began to close, contracting from their edges towards the centre, the coppery tubercles faded, and the gumma in the muscles of the cheek died away. No local applications were used except simple dressings. I write at the end of one month from her admission, and she is well, or what she calls well. I should now advise for her a gentle course of biniodide of mercury for a week or two, followed by a prolonged course of iodide of potassium.

I will only select one more case from a large number of similar ones. Mr. ——, a gentleman of fortune, who enjoyed every advantage in conditions of life and skilled advice, had never been able to shake himself free from an old syphilis. He had no cutaneous eruption of importance, but was spare, haggard, and sallow; his hair fell off, his appetite was capricious, his bowels irritable, and his strength deficient. He was liable also to neuralgias, which were really dreadful, often amounting to great agony. They were chiefly cranial, but also of the nocturnal tibial variety. There were many irregularities of the cranium and of the flat bones. Mercury and iodides, though administered under first-rate advice both in England and in Germany, had failed to relieve him; for they were so ill borne that no continued course could be prescribed, whether combined with tonics and nutrients or alone. I advised him to lay in a quantity of sarsaparilla, and to have the decoction made at home, so that he might take it in quantities daily. The medicine agreed with him, and he tried it carefully. He took at most about two pints daily of the Pharmacopœia strength, and he took this for about three months. Altogether he took more or less sarsaparilla for about five months. He found his improvement so satisfactory, that I had no difficulty in persuading him to continue the treatment. His general nutrition improved first, and the "cachexia" abated; in the next place his neuralgic pains diminished and disappeared. Since this time nearly two years have elapsed, and he has remained healthy and vigorous beyond the average of men, being able to hunt four days a week and to carry out many important engagements without any signs of fatigue. Such is our mode of administering sarsaparilla at the Leeds Infirmary, and such are the cases which need it. I hope soon to hear that our practice has been found useful by our brethren elsewhere.—*Practitioner, May*, 1870, *p.* 257.

84.—ON THE USE OF MERCURY IN THE TREATMENT OF SYPHILITIC AFFECTIONS OF THE SKIN.

By Dr. McCall Anderson, Professor of the Practice of Medecine in Anderson's University, Glasgow.

[While mercury is of little use in the treatment of non-specific affections of the skin, except in so far as it is of value as a purgative or corrector of digestive derangement, it is invaluable in appropriate cases, in syphilitic affections.]

We are justified in bringing the patient fairly under the influence of mercury under the three following conditions, although it is not always necessary to touch the gums, and certainly in no case should salivation be courted.

1st. When we have to treat one of the earlier of the cutaneous manifestations of syphilis in a person of sound constitution.

2nd. When the syphilitic poison has not only attacked the skin, but also some delicate organ, such as the eye.

3rd. When, in a person of sound constitution, we have to deal with a circumscribed syphilitic eruption of old standing, which resists external *applications* and iodide of potassium in full doses.

A gentleman, resident in the West Highlands, consulted me a couple of years ago with regard to an obstinate syphilitic eruption of old standing, implicating and limited to, the soles of his feet. The patches were slightly coppery in tint; their edges were composed of segments of circles; and the skin was for the most part thick and almost horny. He had taken iodide of potassium *ad nauseam*, and had tried all kinds of external applications, including the use of blisters, under the direction of one of the most celebrated surgeons of the day; but to no effect. He was an exceedingly strong and healthy man, and I had therefore no hesitation in giving him a course of mercury. Within three weeks the eruption had completely disappeared; and there has been no return since, while his general health remains as perfect as before.

Instead of administering mercury by the mouth the process of subcutaneous injection, as recommended by Lewin and others, may be tried—a mode of administration from which I have obtained excellent results. Four grains of the perchloride of mercury should be dissolved in an ounce of distilled water, and of this from seven and a half minims at the least (*i. e.*, a sixteenth of a grain) to fifteen at the most (*i. e.*, an eighth of a grain) should be injected once daily. It is indifferent where the injection is made, except that the least sensitive parts and the parts least liable to pressure should be selected. It possesses the following advantages:—1. The dose can be regulated with the utmost precision. 2. The medicine has no tendency to derange the digestive organs. 3. It acts with greater rapidity than when the perchloride is administered by the mouth. (Three or four weeks usually suffice for the cure.) 4. A much smaller quantity is sufficient to produce the desired effect (about three grains on an average.) 5. It does not usually produce salivation, although stomatitis is a frequent result. The process has, however, the following disadvantages:—1. The operation is somewhat painful, and much pain is experienced for several hours after each injection; so that patients sometimes object to its continuance. 2. In exceptional cases—once in about two hundred injections (Lewin)—the operation is followed by circumscribed inflammation and abscess.

Another mode of employing mercury is in the form of the *mercurial vapour bath*, which is specially valuable in the treatment of syphilitic ulcerations of the skin, and also of syphilitic eruptions occurring in cachectic subjects; but I am not prepared to coincide with those who laud it as the most effectual, although it is undoubtedly the safest method of bringing the system under the influence of mercury in every case. The preparations which are most frequently employed for this purpose are the subchloride and the bisulphuret; of which half a drachm of the former, and from a drachm to two drachms of the latter, may be used for each bath. The mode of carrying out this treatment, and its special advantages have been fully discussed by Mr. Langston Parker and Mr. Henry Lee, to whose writings I must refer you for further details.

In syphilitic eruptions occurring in infants, the subjects of hereditary taint, mercurial treatment is certainly curative, provided it is commenced before the poison has had time to produce profound syphilitic cachexia. Indeed, there is no other treatment which appears to have any material influence over the disease; so that, in my opinion, to withhold mercury in such cases is altogether unjustifiable.

As a rule, the most simple and most satisfactory way of treating infants is to rub into the eruption, night and morning, an ointment containing mercury, such as I have indicated in a previous section, or to make use of the mercurial belt. A piece of mercurial ointment the size of a bean should be rubbed daily upon the inside of a piece of flannel two and a half inches broad, and sufficiently long to surround the body of the child about the level of the umbilicus, and this should be worn until two or three weeks after the complete disappearance of the symptoms. Should the ointment, however, irritate the skin, and tend to produce an erythematous or eczematous rash (*the so-called* eczema mercuriale), the belt may require

to be removed for a time, during which the ointment may be rubbed into some other part of the body.

Every one is familiar with the cutaneous manifestations of infantile syphilis, but it does not seem to be generally known, at least there is no allusion to it in most dermatological works, that eruptions occurring after the infantile period in children and young persons are sometimes dependent upon hereditary syphilis. The diagnosis is often difficult, but the beneficial effects of a mercurial treatment sometimes serve to convert a suspicion of syphilitic taint into a certainty,—*Lancet, June* 18.

85.—ON THE USE OF CARBOLIC ACID IN A CASE OF SYPHILIS WITH SEVERE THROAT SYMPTOMS.

By Dr. C. Swaby Smith, Seaforth, Liverpool.

In the month of July, 1869, a respectable married woman, about thirty-two years of age, was brought to me suffering from great general debility, and from local soreness and irritation, the result of syphilis, contracted originally, a few years before, from her first husband. When first seen by me, the whole throat internally was in a shocking state, the disease involving all the parts included in the pharynx, isthmus faucium and soft palate. The tonsils and uvula were destroyed, and the whole of the pharynx as far as the eye could reach above and below was one sloughing surface, which was constantly secreting a tenacious and most offensive pus-like matter. Not only the mucous membrane, but a great part of the muscular substance of the pharynx, had been destroyed, so that the whole aperture of the throat was much larger than it ought naturally to have been. The disease had also spread quite through the posterior nares, and there was a constant discharge from the nostrils. The urgent danger, however, arose from the terrible condition of the throat; for, owing to the excessive soreness and irritation, it was hardly possible for the patient to swallow food of any kind, whether liquid or solid. What she did manage to get down was mixed with the offensive matter from the discharging surface, which appeared to derange her stomach, not to speak of the miserably unpleasant sensations involved in the process of eating or drinking. The woman had, in truth, taken very little in the way of food for several weeks, and almost nothing for some days before I first saw her. The emaciation was extreme, and the circulation exceedingly feeble. And it is not unreasonable to suppose that death would have taken place in a short time, either from exhaustion or hemorrhage. In fact, she had herself given up all hopes of life, having received little or no benefit from former treatment.

My first interview with the patient took place on July 2nd, 1869, on which day I applied, by means of a camel's-hair brush, Calvert's carbolic acid (made fluid according to the printed instructions, but not diluted in any degree) to the whole of the diseased surface, passing the brush upwards as far as the posterior nares, and downwards almost into the œsophagus, bringing away at the same time a large quantity of the offensive and tenacious secretion. On this same day she took, by my orders, a pint and a half of porter, half a pint of beef-tea, and an egg. She was also ordered to take five minims of liquor cinchonæ, five minims of Battley's solution of opium, and ten grains of iodide of potassium, in an ounce of water, three times a day.

July 3rd. Came again (being just able to walk from her own house, a few doors off) at 10 a. m. Can speak more distinctly; says her throat is much less sore, and can eat with far less pain. The throat was brushed out as before, but with a solution of only 1 part of carbolic acid to 60 parts of water; this operation being repeated in the evening. Took during the *day three-quarters* of a pint of beef-tea, a pint and a half of porter, a pint *of milk, and an egg.* Medicine continued.

4th. The lotion (1 to 60) was again applied morning and evening. About the same quantity of food taken as on the 3rd. Medicine continued.

5th, 6th, 7th, 8th, and 9th. The same application in the morning and evening of each day, and about the same quantity of food taken each day. At the last date (the 9th) the patient felt a return of the natural relish for food, which had been quite wanting so far, and said she could eat nearly every half-hour, without pain and almost without discomfort. Medicine as before, three times a day.

The same topical application was continued twice a day until the 17th, when a solution was made of 1 part of Calvert's carbolic acid to 30 parts of glycerine, this lotion being then applied twice a day until the 3rd August, from which date until the 12th August the glycerine lotion was applied once every alternate day, then again on the 18th, and lastly on the 26th August.

A change in the medicine first ordered was made on the 14th July, but iodide of potassium was taken continuously until the 21st July, when it was discontinued, and syrup of iodide of iron substituted.

The patient left this neighborhood about September 1st, wonderfully improved in health and general appearance. She had gained much flesh, could walk a good distance without sensible fatigue, slept well, and could eat almost anything that came in her way. My patient again called on me on the 1st of February in the present year, when her appearance was still more improved. In fact, she was in good condition, and had also become pregnant. The throat had filled up to about its normal size, and was covered with a perfectly healthy mucous membrane. It must be said, however, that she still suffered from a discharge from the nostrils, and also from one of the legs. She had been directed to pass frequently up each nostril a syringeful of carbolic acid lotion (1 to 60) until she felt it trickle out at the posterior nares. This she had done with regularity, and with some benefit; but there is obviously a vast difference between such a plan and the direct application of the lotion by means of a suitable brush. As the syphilis is of long standing, it is quite possible that the nasal bones may be involved in the destructive process. Of course the fact of the discharge from the nose and leg proves that the disease is not eradicated from the system. It is true to say, however, that the patient has, medically speaking, taken a new lease of life; for any member of the profession who had seen her in the first instance would scarcely have doubted that, unless prompt remedial measures had been adopted, death would soon have taken place.

The main point to which attention is wished to be called in this case is the beneficial effect which was so rapidly produced by the direct application of the carbolic acid to the throat. The excessive soreness began to decrease after the first application. The secretion from the diseased surface, which was mopped away each time, as much as possible, also regularly decreased in quantity, and became less offensive. After the first few days a new action was evidently set up, healthy granulations made their appearance, and the whole aperture of the throat, both above and below, was reduced in size. This was proved, as far as the upper part of the pharynx was concerned, by the fact that after a time the camel's-hair brush could with difficulty be pushed upwards so as to reach the posterior nares, though this was easily accomplished in the first instance. When the patient was last seen, the whole throat, as has been stated, had recovered its normal capacity, and was, with the exception of the lost parts, in a natural and healthy condition.

It is safe, therefore, to affirm that in this instance the topical application of carbolic acid to the extensively and almost hopelessly diseased throat of a syphilitic patient was of the most essential service. It does not of course necessarily follow that the acid would be equally efficacious in all other cases of the same kind. Taking into account, however, the fact that the other strong acids have often been used as a local application to the throat

diseased from the same cause with little or no benefit, it is surely not too much to say that the result of the use of carbolic acid in this instance should lead the profession to make a fair trial of the same remedy in like cases.—*Lancet, June* 4.

86.—ON THE TREATMENT OF GONORRHŒA.

By Frederick C. Skey, Esq., C.B., F.R.S.

In the treatment of gonorrhœa, we should always keep in mind the important fact that it has a natural period of subsidence, or cure, if untreated; that at the expiration of six to eight weeks it will die a natural death. Therefore, it cannot be a wise or judicious proceeding to commence the treatment by active purgation, or other forms of depletion. I believe a mild aperient or two to be unobjectionable, and I have found benefit from a powder containing twenty grains of jalap and two drachms af powdered gum arabic, taken at night in half a tumbler of milk. This may be repeated two or three nights, and then I think we should rest on our oars for a week or ten days, abstaining from active exercise, but adhering to the usual habits of diet, unless the daily consumption of wine or other alcoholic drinks is large; if so, I would reduce them partially both in quantity and potency. As early as the local pain and the profuse discharge are somewhat reduced, I advise you to resort to iron, quinine, or other tonics, and to increase the consumption of wine on the same tonic principle, commencing with a moderate dose, and increasing the quantity rapidly up to a full dose of the compound medicine. I generally prescribe ten or twelve grains of the citrate of quinine and iron twice daily. At the expiration of about a week from the commencement of the treatment by tonics, I would suggest a simple injection of one grain of sulphate of zinc to the ounce of water, to be used night and morning, and then thrice daily. It may be necessary towards the latter stage, if the progress is slow, to add ten minims of copaiba balsam twice daily. Beer is unobjectionable.

In cases of primary gleet the success of the tonic treatment above-mentioned is remarkable, as it will often, in mild cases, cut the eiseas short in three or four days; but in such examples there is an entire absence of painful micturition and chordee. If these symptoms are present, the tonic agents should not be resorted to until the expiration of a few days. If, unfortunately, orchitis should occur pending its existence, the treatment by tonics, most valuable in its absence, should not be resorted to.—*Lancet, Sept.* 24, 1870, *p.* 428.

MIDWIFERY,

AND THE DISEASES OF WOMEN AND CHILDREN.

87.—HYPODERMIC INJECTION OF MORPHIA IN TEDIOUS LABOUR FROM RIGID OS UTERI.

By Dr. CHARLES W. SHAW.

Seeing, some short time ago, in an American Medical Journal, an account of the successful treatment of several cases of rigid os by means of morphia internally administered, and being favourably impressed with the arguments there used, I determined, if I should have an opportunity, to put its utility to the test.

The first case in which I saw an occasion for its profitable use was a *primipara*, æt. thirty, of sanguine temperament, who had been forty-eight hours in labour, membranes having ruptured some four days previously, and the os not larger than a florin, thin and indilatable. Having suffered so much, and being in a very nervous state, she was desirous of my remaining with her. I waited in the house for about six hours, and when the pains, although strong and frequent, were not producing the desired effect on the os, I determined to try the morphia treatment, more desirous of obtaining sleep for my patient than of hastening the labour. Having been called in unexpectedly to see this lady when I was out driving, and unprovided with any of the usual supplies, and being some six miles from any place where I could obtain a preparation of opium, I was rather nonplussed at first; but, fortunately, seeing some paregoric elixir, I gave her half an ounce, which, for twenty minutes or half an hour, appeared to produce no sensible effect, except diminishing the severity of the pains, though they continued as frequent and as long as before, till my patient called me, and said she thought the child was nearly born. I found the head pressing on the perineum, and in a few minutes delivery was accomplished—the placenta came away naturally, and everything went on favourably. The time from the administration of the paregoric till the conclusion of the labour was forty-five minutes.

On the 2nd July I was asked to visit another lady, æt. 23, also *primipara*, who had been in strong labour thirty-six hours. At the time of my visit—three o'clock—I found the head presenting, and the os not larger than a shilling. I advised waiting, and left. Was sent for at 5 a.m. next morning, when I found every thing almost in *statu quo*, but my patient extremely exhausted. Having a syringe in my pocket, at 6 a.m. I injected 0·25 gr. of morphia, and had the pleasure of finding the os dilating rapidly, and labour completed favourably in about three hours from the time the morphia was used.

Again, on the 9th August, at 1 a.m., I was called to visit another case, æt. 35, who, although mother of three children, had not been pregnant for twelve years. She had been in labour for more than twenty-four hours; and, as all her previous confinements had been easy and rapid, she was considerably alarmed as to the result this time. Finding the membranes sound, with the pains moderate, and the os barely dilated, I left, seeing her in the course of the evening, when I found slight change. Next morning, at 6 a.m., I was sent for, membranes having ruptured from the violence of the pains; but the os not larger than half-a-crown. At this time she also complained of pain a little to the right of the umbilicus,

where there seemed to be a thickening of the wall of the uterus. Partly to relieve the pain, which she complained of most bitterly, but chiefly to expedite matters, I injected 0·40 gr. of morphia, and in the course of two hours the child was born. The placenta was adherent just in the place where the hardness was perceptible after the escape of the liquor amnii.

I think the moderate use of any of the preparations of opium, either internally or hypodermically, would be productive of the happiest results in those cases where the rigidity of the os proceeds from an extreme amount of nervous irritability.—*Medical Press and Circular, Aug.* 24, 1870, *p.* 137.

88.—A CASE OF RUPTURED UTERUS SUCCESSFULLY TREATED.

By Dr. Scott. of Bagnalstown, Ireland.

On Thursday, the 28th of July, I was sent for to attend in her confinement a poor woman residing in the neighbourhood of this town. As I happened to be from home at the time, Mr. Borthistle, of the City of Dublin Hospital, who was on a visit at my home, kindly attended. On examining the case he found some symptoms of ruptured uterus, and knowing the woman to be in a dangerous condition. at once despatched a messenger for me. I arrived about four o'clock, p.m., bringing my midwifery instruments with me, and found the patient in bed. She was a thin, spare woman of about forty-five years of age, and the mother of five children. Her previous labours had been natural and of short duration. She always enjoyed good health. Her pains, I was told, set in about six o'clock the evening before, after a row she had with a neighbouring woman, but they were not troublesome until six o'clock in the morning, when there was a good deal of flooding. The waters came away about ten o'clock, and for two hours the pains were very violent. The nurse in attendance stated that she expected the birth of the child every moment, as the head was well down in the perineum. The patient was resting on her knees and elbows, and during a very violent pain, she suddenly found something break (own words), and she described the rupture as something like the bursting of a bladder, with a rush of water in the lower part of the abdomen. Labour pains at once ceased, but a more distressing pain set in about the pit of her stomach, with great tenderness to the touch, and sickness with inclination to vomit. On examining the abdomen externally, I felt the limbs of the child through the thin walls, about two or three inches below the ensiform cartilage; and, on examining per vaginum, I found the head had receded about four inches, which helped to confirm the diagnosis Mr. B. had made, that there was an extensive rupture, and that the child had partly escaped. It was my duty to deliver her immediately, but from circumstances over which I had no control, did not attempt to operate until after eight o'clock—remaining with her all the time. Previous to operating, I gave a full dose of opium with brandy. I had very little trouble in getting on the forceps, but had a deal of pulling before I delivered her of a very large male child, who was, of course, dead. As there was no hemorrhage, I let the woman rest for about twenty minutes, then introduced my hand to take away placenta, which I found over the right ileum floating in fluid. On gently pulling the funis, it came away, followed by about a pint of dark grumous blood. While my hand was in the abdomen I could distinctly feel the uterus firmly contracted. After giving her some stimulants with laudanum, I attempted to put on the bandage, but the tenderness of which she all along complained was so great, that she would not allow me to tighten it on her.

My young friend Mr. B., suggested grain doses of opium, which I gave *her every* two hours, combined with two grains of the gray powder, and

this she continued to take until the gums became quite tender; unseed poultices and stupes being kept applied to the abdomen. Immediately the gums were affected she began to get relief from the pain and tenderness. Her diet consisted of milk, chicken broth &c., but no more stimulants were allowed, nor were they much indeed. What appeared strange there was no lochia, or other discharge, during recovery. The woman is now quite convalescent (August 29th), and able to go about. The cause of the rupture I cannot say; there may have been some thinning at the seat of rupture, which could not resist the strong labour pains.—*Medical Press and Circular, Sept.* 28, 1870, *p.* 241.

89.—ON THE INFLUENCE EXERTED BY CHLORAL ON THE PAIN OF PARTURITION.

By E. LAMBERT, Esq., Paris, late House-Surgeon in Maternity Hospital, Edinburgh.

As *the* hyponetic of this first stage, chloral stands as yet unrivalled; we have only to remember that opium, our only sure refuge, must be administered with the knowledge that we are conspiring, though for a higher end, against the course of labour.

It is with an earnest wish to further the progress of our art that I invite attention to the bare statement of the whole facts which have come under my observation. None more than yourselves will feel the interest that attaches to researches in this particular direction—none, I am sure, will be more anxious to employ the keen edge of criticism to the profit of experimental science.

Case 1.—Bridget M'T., aged 25, in her second pregnancy, was admitted to the Maternity Hospital at 8 a.m., 31st December, 1869. The os was fully dilated, the membranes entire, the head in first position, resting on the brim of the pelvis. The pains, carefully noted, were recurring about every five minutes from 8.50 a.m. to 10. Sir James Simpson, accompanied by Dr. Jenkins, U.S., and Dr. Coghill, attended at 10.15, and ʒ i. was then administered. It was vomited six minutes after; and at 10.28, ʒ ij. were given in an enema; this was voided five minutes after. At 10.40 the patient had slight rigors, and from 10.45 to 11 there was marked somnolence in the intervals of pain. She then said she felt seepy, but could not sleep, and this sensation passed away shortly. At 11.18 ʒ i, was again given and vomited immediately. This was followed by rigors and somnolence, as above, for the space of fifteen minutes. At 11.45 ʒ ij, were administered in an enema, but voided during the next pain. At 12.15 the membranes were ruptured artificially. From 12 to 1 the bowels were moved twice. The patient had contsant eructations, and vomited twice. The labour terminated at 3.45; the pains remained throughout efficient.

Case 2.—Agnes P., aged 22. Primipara. Admitted to the Maternity Hospital at 6 p.m., 2nd January, 1870. At 7.30 the os was the size of a half-crown; the head, first position, was entering the pelvis, the membranes entire. The pains were strong, at very regular intervals of five minutes. In the intervals of pain has constant slight rigors, which become much stronger during the pain. At 9.25 the membranes ruptured spontaneously, and at 9.30 the head was in the perinæum.

Sir James Simpson attended at 9.50; chloral ʒ i. was then administered, 9.55. Says she feels the pains less. At 10, ʒ i. again given; the rigors ceased, and the patient seemed to sleep in the interval of a pain. At 10.4, she is remarkably calm. At 10.9 there was a slight rigor, then a severe pain, and a sharp cry; and at 10.10 the head was born. Answered questions; said the pains were much less severe since she took the medicine, and that she slept in the intervals. 10.30. Sleeping very quietly, answered a question, and fell off again immediately. Removed placenta from vagina without any indications of consciousness on the part of the patient. 3.30, Woke and said, "Where am I?" Hearing her child cry,

said, "Whose child is that?" Did not remember birth of child; took food, and slept soundly till morning. Questioned next morning, she affirmed that she only remembered looking up, and seeing three doctors; remembered taking the medicine and nothing more; knew nothing of the birth of the child.

Dr. Gordon accompanied Sir James Simpson. She made an excellent recovery. Her child had spina bifida. The case was reported to the Society by Dr. C. Bell. Chloral was administered to the infant, whose horrible cries were quieted by it; the spasms were also stopped by its influence.

Case 3.—Margaret O., aged 26. Primipara. Admitted to the Maternity Hospital at 5 p.m., 4th January, 1870. Had felt pains since 7 p.m., 3rd January. At 8 a.m., 4th January, saw a doctor, who told her she was in labour. Took train from Stirling, and was directed to Maternity. Edinburgh.

4th Jan., 5 p.m. Os size of a shilling, rigid. Membranes entire. Head, first position, entering pelvic cavity. Pains strong.

5th. 12 noon. No progress. Pains apparently very severe. Patient much excited during their recurrence, and very unruly. Moans constantly during intervals. Has refused food for twenty-four hours. Pains strong, but intermissions irregular, and pain never absent. Sir James Simpson attended at 12.45. Chloral ʒi, was given. 1.7. Marked somnolence during intervals of pain. 1.18. Quiet sleep during intervals. She always gets on her knees during the pains. These appear just as severe, but the intervals are at least two minutes longer, and very regular. She always reassumes the supine posture before the pain is over, and falls asleep again immediately. 1.40. Says the pains are very sharp, and complains that medicine is doing no good. Has much difficulty in getting on her knees. Her movements are unsteady. Eyes fixed, haggard; equilibrium uncertain. Ordered not to leave the supine posture. 2.35. Pains very, very severe. Still regular. Moans during intervals. 2.48 Chloral ʒi. 3.10. Perfect repose during intervals of pain. 4.30. Again becoming agitated and anxious. 5.30. Os dilated. 7. Dr. Walker ruptured membranes. 7.30. Chloral ʒi. From 7.30 to 10, when the head was born, this last dose remained efficient. There was always quiet sleep during intervals, and the pains were not very sharp. At the exit of the head she showed no sign of greater pain. When all was over she said that the medicine had given her great relief, and pointed especially to the sleep she enjoyed in the intervals. Made same statement next morning.

Observation.—The marked effect in this case was to bring about perfect regularity in the recurrence of pains. These occurred at intervals sensibly longer, and I think it may be fairly stated that the patient was not fully conscious for more than two-thirds of the duration of the pain.

Case 4.—Mrs. C., aged 40, tenth pregnancy. 2, Campbell's Close, Cannongate. 8th January, 1870. Attended case of Dr. Somerville's. Head at brim, first position. Os fully dilated. Pains rare and weak. Dr. Somerville reported that she was making no progress for some time back. 1.20 a.m. Gave ext. ergot. liq. ʒi. 1.32 Head has entered cavity. 1.35. Gave chloral ʒi. 1.40. Full, deep respiration, and perfect quietude. 1.45. Pain apparently less felt. 1.50. Strong pain. Head on perinæum. 1.55. Gave chloral ʒi. 2. Sleeping. 2.8. It is not very evident that she is under the influence of the medicine. Pains follow close upon each other. 2.15. Head born, much apparent pain.

Observations.—There was a drunken husband, four children, and constant noise and talking. Impossible to obtain quiet, even long after child was born.

8th Jan., 1 p.m. Stated that she was conscious throughout. Felt very dizzy after second dose, and wished for sleep. Slept well the remainder of the night, and has done well.

Case 5.—Margaret M'D., aged 18, primipara. 7. Gullan's Close, In labour since 12 p.m., 12th January, 1870. Vomiting a good deal. 4 a.m. Found os dilated; membranes ruptured; head below brim. Pains regular

—every three minutes. Rectum loaded. Enema. 6.30. Pains neither regular, nor of any duration. Patient very restless: gave chloral ʒ i. 6.40. Strong pain after quiet sleep. Complains little during pains, and is very quiet during intervals. 7.5. Head on perinæum. Gave cholral ʒ i. 7.10. Deep sleep. 7.40. Muttering. Is much agitated. Cannot be kept to any position. Slight delirium. Mother got uneasy; said there was not fair play. Went out, and returned with a midwife. 8 a.m. By this time the patient was quite quiet. Got rid of the midwife. 8.20. Child born. Very little exhibition of pain. Cord over shoulder. Child born without much life. Was liberally *spanked*. Well recovered in three minutes. 8 p.m. Had slept till a little ago. Remembered nothing but "skelpin' the backside" (*sic*). Has done well.

Case 6.—Mrs. F., aged 34, eighth pregnancy, 6, Foulis Close. 13th January, 1870. Sent a nurse to the case, and attended it at 10 p. m. Os size of a shilling. Pains very poor; not regular. 11 p. m. Hardly any progress. Patient has been living on oat-meal, and drinking a great deal of water. Has constant eructations. Ergot ʒ i. Produced instantly an emetic effect. A quantity of very sour-smelling fluid vomited, producing great relief. Pains not improved. 11.25. Ergot ʒ i. retained. 11.35. Vomited a little. 11.50. Good dilatation. Pushed up anterior lip. 12.15 a. m. Birth of a female child. Another in utero. Membranes entire. Head presenting. 12.25. I now gave chloral ʒ i., trusting to it to get over the second birth unknown to the patient. 12.45. No progress. Head still at brim. Ruptured membranes, and gave chloral ʒ i. 12.52. Vomited, and continued to vomit frequently. 1.15. Head at outlet; forehead presenting. The patient was not delivered until 5 a. m. of a female child, dead. I applied forceps in presence of Dr. C. Bell, Dr. Walker giving chloroform. The patient was quieted for some time by chloral. She was sub-delirious for about half an hour. She slept a good deal.

Case 7.—Mrs. B., aged 19, primapara, 25, College Wynd. Menstruation 5th July, 1869. Married 9th July, 1869. Fell, going up stairs, 20th January, 1870. Woke with pains, 22nd January, 8 a. m. At 4 p. m., I found both feet presenting *sacro-posterior*. 4.30. Right foot near vulva. 4.40. Gave conjointly ergot ʒ i., chloral ʒ i. 5.10. Child born, with exomphalos size of half a large hen's egg; cord 1½ inches broad. Child 6½ months. Appeared dead; after twenty minutes of continued efforts it was resuscitated: it lived thirty hours.

Case 8.—Anne A., aged 27, second pregnancy, 14, Cowan's Close. At her first labour five years ago, twins, seventh month; had chloroform in infirmary, where she was under treatment.

7th February, 1870. Case of Mrs. M'Swiney. I attended at 7 p. m. Breech *sacro-anterior*. She was a terribly unruly patient, and howled at the top of her voice during her pains, although they were not prolonged; she never ceased to ask for chloroform. At 8 p. m., the breech being well in the cavity, I gave conjointly ergot and chloral āā ʒ i. At 8.4, a prolonged pain, with no exhibition of suffering. At 8.7, making a sort of humming noise. For the next ten minutes she was in a very excited state, rolling her head from side to side on the pillow, throwing her arms to and fro in cadence, accompanying the motion with an extraordinary guttural noise; inspiration and expiration both sonorous, the first very short, the second very much prolonged; now and again a wild cry at the top of her voice during the pains. Within half an hour from the administration, she was herself, and continued her screams till the birth of the child at 9 p. m. Except whilst she was delirious, she continued to ask for chloroform. The child was at full time; the fœtal heart was getting weak when I gave ergot. The labour was not hastened by it, and I could not find any trace of life when the child was born.

Case 9.—Janet B., primipara, Royal Maternity Hospital. Patient had been suffering for twelve hours, when I was called to see her at 4 a. m., 15th February, 1870. Os just admitting extremity of finger; thin, soft, membranes entire, pains regular and strong. 9 a. m. Pains are still

strong, but recur at rather longer intetvals (¼ hour.) No change in condition of os. 10 a. m. As above, patient very weary. 11 a. m. Chloral ʒ ss, same dose repeated every half hour. 12 noon. A double dose. 12.30 p. m. A single dose. 12.45. A single dose, ʒ iii. in all. Up to this time she had been conscious, even during the intervals of pain, getting off her bed during the pains, talking rationally, feeling sleepy, but unable to sleep. The pains recur every 7 minutes, are sometimes intercurrent, and of long duration. She was ordered to keep the bed during the pains; and when examined, the os was found still in the same condition. 12.55. Perfect repose; pulse soft, 88; respiration 18, very easy; pupils normal. She remained for half an hour asleep in a state of the most perfect repose. 1.30. Believing the anæsthesia to be sufficient, I asked Mr. Hinchliffe, who was present, to examine her; he found the os dilated to size of half-a-crown, and brought away some perfectly fluid blood. Dr. Keiller had first arrived, and he examined the patient. Unfortunately the first examination had disturbed the rest, and she was now agitated and complaining, rolling her head on the pillow, and asking for the nurse to support her back. She was, however, but partially conscious. By a singular concurrence of circumstances, a patient in labour with her fourth child was at the same time on the second bed of the Delivery Room, just completing the second stage of a painless labour. This and her former labour (3rd and 4th) had been without pain, and the contrast was painfully disadvantageous. 1.55. Chloral ʒ ss. 2.10. Excited, talking much. 2.30. Quiet and apparently unconscious, notwithstanding the disturbance attending the termination of the other labour, and the squalling of the child. 2.40. Again awake; eyes open naturally for the first time since nearly two hours. Asked her whether that child was hers. Said she thought she could not have got over it so easily. Asked her again whether it was her child. She felt her abdomen and said, No. I was unable to watch the case longer. The labour terminated at 8.30 p. m. Os remained as above till 5 p. m., when it began to dilate, and second stage was only one hour.

Case 10.—Jessie R., aged 24, second pregnancy, 19 Vennel. Had her first child at the Edinburgh Maternity, three years ago, under chloroform.

18th February, 1870. On the present occasion was in labour since 12 p. m. 4 p. m. Head low in cavity; membranes entire; pains frequent and strong. Ruptured the membranes. Patient very weary, very excitable, crying for chloroform. 4. 10. Gave chloral ʒ i., and told her it was the new way of giving chloroform. Head was advancing, and anæsthesia not marked; gave chloral ʒ i. She almost immediately ceased to manifest any excitement; remained quite quiet, and complained no more, not even when the head passed out at 4.40. Twenty-five minutes later, the placenta being still retained in utero, I introduced the hand, and found a portion of it grasped tightly at the left superior angle; withdrawing it, I failed to remove a portion of membranes, and re-introduced the hand, which had to contend with the same cause of retention. Patient perfectly unconscious. About forty minutes after the birth of the child, she began to speak from time to time, and soon opened her eyes. The noise of the child crying prevented her settling down to rest; but she was ignorant of the birth of the infant, and frequently asked whether "she was better—whether she would soon be better." She never inquired whether that child was hers. I had put the binder on over the naked abdomen, and she several times declared that somebody must have carried away her shift.

She now began to talk of her mother, who died last August, as if alive, and wondered when she would come. Now and then she slept for a minute or two, and then began again to rave; she talked rapidly, and often changed her subject. She said the doctor had tried to persuade her that was the new way of taking chloroform. "The doctor cheated me—I am sleeping but I don't know myself—I wish I could sleep; I am very tired" (with her eyes shut). "I have tasted that stuff, I wonder what it was—I don't know, but it was not chloroform." Repeated often, "Am I better?" 5.25. Began to remember that her mother was dead, but on Dr. Niven coming,

in, asked when her mother would be back. Left her at 5.45. 8 p. m. Found her asleep, and was told she had been talking a great deal of nonsense.

19th Feb., 10 a. m. Did not sleep well on account of a cough she had had some time past, otherwise quite well. Remembers the birth of the child—does not remember the removal of the after-birth. Says that the new chloroform is longer putting you over, but there is not the painful whirring sensation in the head.

Case 11.—Mrs. X., aged 23; primipara; in good health, but much troubled with nervous irritability during her pregnancy. Her dread of pain exceeds any powers of description. Her labour began just after midnight, 9th April. When she could no longer doubt that she was in labour, her excitement and irritability became great. Chloral was administered in 3 ss. doses every half-hour from 1.30 to 2.30 a. m. The effect was manifest by the time the second dose was taken, but it seemed desirable to continue the administration, in order to remove some remaining indications of restlessness. From this time, 2.30, to 8 a. m. the pains continued regular and strong; the patient quiet, and perfectly unconscious. An examination made at 6 a. m. showed the os fully dilated, and every thing normal. The bladder was emptied with the catheter. At 8, contractions began to flag, and before 10 I wrote to Dr. Keiller, advising him of the state of the case. He was in attendance immediately, and examined the patient. Condition of perfect quiet; pupils rather large, but perfectly contractile. No signs of suffering on the part of mother or child. Dr. Keiller decided to wait. Labour made no advance. The head remained as above, in good position, but in the middle of the cavity. Towards 2 p. m. the patient became restless, and would not lie long in any position, rolled the head from side to side frequently; no speech. At 3 p. m., Dr. Keiller delivered with forceps a male child, which was with difficulty resuscitated, and which remained for twenty-four hours very weakly. Chloroform was administered at the last stage of labour, and its effect was, on the one hand, to quiet the restless agitation, and, on the other, to restore speech, and with this singular result, that the mental preoccupation, which one would have supposed effaced, was revealed as intense as ever; the few words she spoke having reference to her one extravagant preoccupation—her labour. The placenta was expelled naturally within ten minutes. She took food that evening, and slept soundly till next morning, feeling perfectly well, but *hurt*—so that here again her nervousness intervened to retard her recovery; for some slight pain about the parts when attempting to pass water, alarmed her, and she maintained a voluntary paralysis of the bladder for three weeks, and was only cured of it by the exercise of moral severity. The passage of the catheter left behind much irritation of the bladder. The convalescence was interrupted by an attack of fever—thirty-six hours' duration—on the twelfth day. She gave up nursing five weeks after her confinement; but improper management of the child, from the twelfth to the fifteenth day, must be considered the chief determining cause of this change.

Conclusions.—1. Chloral is an agent of great value in the relief of pain during parturition.

2. It may be administered under favourable circumstances during and at the close of the second stage, with the result of producing absolute unconsciousness in the same sense in which we understand unconsciousness under chloroform.

3. When thus given successfully, it has this advantage over chloroform, that it requires no interference with the patient.

4. It is desirable to retain chloroform in the position which it at present occupies in midwifery, and to reserve for the agency of chloral the first stage of labour. If, however, chloral or some agent having analogous properties is found successfully to relieve the pain of uterine contraction, the use of chloroform will be restricted to a lesser period of the duration of labour, or to the facilitation of manual or instrumental interference.

5. It is demonstrated that a labour can be conducted from its commencement to its termination, without any consciousness on the part of the patient, under the sole influence of chloral.

6. The exhibition of chloral in nowise interferes with the exhibition of chloroform.

7. The proper mode of exhibiting chloral is in fractional doses of grs. xv. every quarter of an hour until some effect is produced; and according to the nature of that effect the further administration is to be regulated. Some patients will require doses of ʒ i.; and it is better to produce an anæsthetic effect by ʒ iii, given in the space of two hours than by ʒ i. given singly.

8. The effects of chloral are continued beyond the period of completed parturition, and the repose experienced by the patient after her labour is one of the favourable circumstances to be noted in considering its application to childbirth.

9. Any stimulating effects, in the form of general excitability, occasionally observed during the administration, have passed away very rapidly.

10. Chloral not only does not suspend, but rather promotes uterine contraction by suspending all reflex actions which tend to counteract the excitability of the centres of organic motion.

11. Labours under chloral will probably be found to be of shorter duration than when natural, for unconscious contractions appear to have more potent effects than those which are accompanied by sensations of pain.

12. Experiments are required in order to determine whether there exists the same antagonism between ergot and chloral as is known to exist between strychnia and chloral.

13. The general conditions under which chloral is to be administered are the same as those which regulate the administration of chloroform, and the rules laid down by Sir James Simpson in connexion with this subject must be rigidly adhered to.—*Edinburgh Medical Journal, August* 1870, *p.* 114.

90.—CHLORAL HYDRATE IN LABOUR.

By J. Gerson Da Cunha, Esq., Bombay.

[Of the numerous cases in which chloral is related to have been of service, perhaps none have interested us more than the three following.]

On July 15th, at 4 a. m., I attended Mrs. R., aged 20, a very slender and delicate-looking woman, pregnant with her second child at term. She was seized with labour pains on the previous morning, which returned at long intervals, and were inefficient. She felt much exhausted. Os dilated to the size of a half-crown piece. I ordered a dose of opium, and returned to see her at 10 a. m., at which time she was very restless. Seeing no benefit produced by the opium, I gave her half a drachm of chloral hydrate, to be repeated within two hours in case she could not obtain rest. Soon after taking the dose she fell into a profound sleep, and on awaking, about four hours after, the pains became more active, and she was delivered within ten minutes of a fine healthy child. Both mother and baby are doing well.

About a week after I was called upon to see Mrs. B., a Parsee lady, in her fourth pregnancy and third labour. Her previous accouchements were all tedious. Her age is 25. Had been in labour a day and night. Pains lingering. Os dilated to the extent of a florin. From my former experience I gave her half a drachm of chloral, which procured a deep sleep. She awoke six hours afterwards, and within a quarter of an hour gave birth to a male child. She is in excellent health.

On August 1st, at 11 a. m.. I was sent for to see N. J,, aged 17, a primi-*para.* She was hysterical; had been in labour thirty hours. Pains had

made no progress; they recurred at intervals of thirty and forty minutes. She felt much fatigued, and was dispirited. Os dilated to the size of a florin. I lost no time in giving a dose of chloral. She slept for three hours, and on awaking had two strong pains, which terminated her delivery. Placenta followed about ten minutes after.—*Lancet, Sept.* 24, 1870, *p.* 432.

91.—CHLORAL HYDRATE IN PUERPERAL CONVULSIONS.

By R. Dacre Fox, Esq., Resident Medical Officer, Manchester New Workhouse.

[We do not remember to have met with any account of the use of chloral in puerperal convulsions, so that the following case is interesting.]

On May, 28th, at 2 a.m., I was called by the midwife to see E. S., aged 15½ years, who had been in labour about eight hours, and had progressed satisfactorily till a few minutes before she called me, when, the head having begun to press well on the perineum, the girl went off into puerperal convulsions. When I saw her the fits were not very powerful, but frequent; she was quite sensible during the intervals. I ordered her at once some calomel, a strong mustard plaster to her neck, and a turpentine enema. I saw her again at 6 a.m.; the fits were now much more severe and frequent, she had no pains, and the head was not advanced. At 8 a.m. the fits were almost continuous; she was totally unconscious and very much exhausted. I then delivered her with the forceps of a dead and partly decomposed child. The fits from then till 12 p.m. increased in severity and frequency; her pupils were *dilated* and hardly acted at all. She had a feeble pulse of 100. I gave her half a drachm of chloral hydrate immediately, and ordered the dose to be repeated in two hours if the fits continued. I saw her again at two p.m. The nurse informed me that she had only one fit since my last visit; her breathing was quiet, the pupils were normal and acting, reflex action had returned; she had a pulse of 108, still feeble; there was a very offensive discharge. I ordered her carbolic acid injection. At 8.15 p.m. her pulse was 120; she had no more fits, her breathing was quiet, the pupils were normal, and consciousness was returning. She knew the midwife, and complained of pain. At 11 p.m. her pulse was a little less frequent; she was in a fitful sleep, tossing about the bed a good deal and with occasional twitching. I ordered her the second half drachm of chloral hydrate.

May 21st. 9 a.m.: She had a quiet sleep for six hours after taking the draught, but then became restless, &c., as on my previous visit. Pulse 120; conscious, and no particular pain. I ordered her to take ten grains of chloral hydrate every four hours, in a mixture, with small doses of digitalis, hyoscyamus, and bicarbonate of potash. 6 p.m.; Pulse 120; had slept well, was quite sensible, had taken pretty well of beef-tea and milk.

22nd. Pulse 120; complained of great pain in her head; hot dry skin, loaded tongue; quite sensible, but nervous and excited, and still taking milk and beef-tea. I ordered her to take half an ounce of caster-oil at once, and saline mixture every four hours.

23rd. Pulse 110; had a good night; skin still hot and dry, tongue cleaning, pain in the head much less, still restless and excited; fancies her child is in bed with her; pupils dilated; no pain.

24th. Pulse 120; She seemed a little excited at my visit. Had slept well; slight pain in her head, bowels regular, lochia natural, tongue cleaning, skin moist, delusions gone; taking her milk and beef-tea. Ordered two eggs daily.

25th and 26th. Still improving. Her pulse has gone down; she is very weak; secretions normal.

From this time the patient has been doing well, and is now fairly convalescent. There is no family or previous history of epilepsy.—*Lancet, July*, 16, 1870. *p.* 101.

92.—PUERPERAL MANIA CURED BY CHLORAL.

By Dr. Head.

[The following case occurred at the London Hospital under the care of Dr. Head. The patient was 29 years of age, and the labour, which was her fourth, was quick and easy. The first commencement of the mania arose from mental irritation.]

When seen at 3 p.m., she was in a very restless state. When any one approached her, she would clutch hold of them by the arms, but made no attempt to injure. She followed with her eyes those in the room; and when anything was said in her presence she repeated it. For instance, Dr. Palfrey, who happened to be present, said. "I should give her chloral and support;" and she repeated, "I should give her chloral and port." She talked a good deal, also, of her children, especially "Bobby."

One drachm of chloral hydrate was given in a saccharine solution, with twenty drops of tincture of ginger to disguise the flavour; and I may here remark that this forms a vehicle which is least objected to by patients. Fifteen minutes after taking the chloral she was fast asleep. She awoke about 6 p.m.; was just in the same condition as she was previous to taking the medicine; and so another drachm of chloral was given, when she at once went off to sleep again. She then slept, with only one interruption, when brandy was given her, going off again until 6 p.m. *on* the 22nd (twenty-four hours.) When seen at 8 p.m. on this day she was perfectly rational. She said she was very thirsty; that she had a troublesome cough; and that her tongue was very sore. On looking at her tongue, its surface was clean, but there was a large abraded patch on the left side, as though she had bitten it. Her temperature was 102·4; pulse 120; respiration 30. Her breasts were large; so equal parts of extract of belladonna and glycerine were ordered to be applied, pil. col. co., gr. x, to be taken at once; and, the last thing at night, thirty grains of chloral. She slept all night. In the morning, May 23rd, she felt much better, was without headache, and the bowels had acted several times. Pulse 96; respirations 21; temperature 99·4. She was perfectly sensible, and complained only of her tongue. From this time she had no bad symptoms. By the evening of the 25th, her pulse was 72; respirations 18; temperature 98·4. She had, as a sleeping draught, on the evening of 23rd and 24th, thirty grains of chloral; and, on the 25th, slept perfectly well without anything. On the 28th, she had seen her husband and other friends, and behaved quite naturally with them. She slept well each night; her appetite was good; the tongue healed; and she wanted to get up.—*British Medical Journal, June* 11, 1870. *p.* 602.

93.—THE TREATMENT OF PHLEGMASIA DOLENS WITH OPIUM.

By Dr. C. C. P. Clark, Oswego, New York.

[Phlegmasia dolens rarely involves any danger to life, but it is a disease which is attended by so much present suffering, and so much future ill health, that it deserves more careful study than is usually given to it in medical works.]

For the last fifteen years I have treated this disease with a single remedy: that remedy is opium. Opium cures phlegmasia dolens with more certainty than quinine cures a tertian ague. I speak from the experience of more than a score of cases. The results have been uniform. The remedy does not simply make the patient comfortable: it cures the disease, if a *remedy* cures any disease. I never hesitate to assure a patient attacked

with phlegmasia dolens that her sickness shall be short and painless, and shall not be followed by that disablement that the experience of some neighbour has taught her to fear.

The rule for the administration of the drug is simple: Let the pain be kept thoroughly subdued. It is not too late for the beneficial effect of the medicine so long as the disease is painful, but the sooner the treatment is begun the more complete is its remedial influence. In view of this fact, the first symptom of the disease should receive attention. That symptom is, I think, always pain in the lower part of the pelvis on one side. It may be near the groin, or the back, or the hip-joint, or it may be deeply and obscurely seated. It is generally not severe at first, but it is always accompanied by a certain hardness of the pulse that the *tactus eruditus* easily detects. But whether or not this preliminary pain be noticed, whether the suffering be extreme or moderate, whether the disease be accompanied by much or little fever, whatever the state of the bowels, of the secretions, or of the excretions, the rule of treatment is the same: the pain must be met by opiates, which should be carried to the point of procuring absolute relief therefrom; and their use should be continued till it can be omitted without the recurrence of suffering.

That this remedy does not simply relieve pain, but also actually arrests the morbid process, will be obvious to any one who compares the course and duration of a case treated by it to the progress of one submitted to all or any part of the multifarious treatment that is laid down in the books. It will be still more obvious in the results of the disease; for, in a case early and thoroughly treated by opium, the femoral and other veins will be found after the sickness to be free from those fibrinous clots that under other treatment seal them up for ever. Even in cases where the morbid process has become mature and extensive before opium has been resorted to, the disease will not only be arrested by it, but the evil work already done will generally be undone. Existing fibrinous deposits will soften and dissolve into the current of the blood, and the affected veins will be left pervious. I know, as a matter of repeated and careful observation, that the signs of venous obstruction rarely or never show themselves in any considerable degree after a case of phlegmasia dolens that has been vigorously handled by opium.

The control of opium over active fibrinous inflammation of the veins is not confined to this seat of that disease. I have seen repeated instances of its power in those accidental cases of inflammation of the veins which intervene in the course of other diseases. I do not see in this any specific or peculiar power. I believe it is the same control which we see more or less evinced by opium over all the fibrinous inflammations. We all know the great influence that it displays, especially if used early, in peritonitis and pleuritis. It is not strange that it should check also an inflammation of the veins. On the contrary, the seat and the other conditions of that inflammation are especially favourable to the influence and permission of the free use of opium. I may add that the parturient condition, anæmic, irritable, and exhausted, is especially suited to the beneficial effects of this drug.

I by no means claim originality in the use of this remedy in this disease. Most practitioners, I am well aware, resort to it for relieving pain and for procuring rest, and many of them, I have no doubt, place on it their main reliance. But I go farther than even these last; I use opium and nothing else, and I make my patients comfortable and give them a quiet and complete cure.—*Medical Record, June* 1, *p.* 155.

94.—NEW METHOD OF SECURING THE PEDICLE WITH SILVER WIRE, IN OVARIOTOMY.

By Dr. Thomas Addis Emmet, of New York.

The proper treatment of the pedicle after the removal of an ovarian tumour still remains a mooted question. Dr. Thomas Addis Emmet states (*Am. Journ. Obstetrics*, Feb. 1870), that the various means proposed are all applicable to certain conditions of the pedicle, but no single method has yet been accepted as combining the advantages of each in common, and applicable to all cases. His preference has been "in favour of returning the stump whenever it was practicable to do so, and of closing the abdominal section. The silk ligature, in its ready application, presented many advantages over the silver wire, but I have used chiefly the metallic suture in preference, regarding its use as attended with less risk afterwards. The method, as practised by Dr. Sims, of securing the pedicle by means of a series of interrupted silver sutures, I have used several times, and considered it a great advance. I found, however, that without the pedicle was a thin one, troublesome oozing of blood frequently occurred from the tissues becoming lacerated in the tract of the sutures, as a consequence of the tension exerted in an opposite direction, as each loop in turn was twisted.

"October 18th, 1869, at the Woman's Hospital, I removed, from a patient thirty-three years of age, a multilocular ovarian tumour, weighing forty-five pounds, which had been of some two years' standing. As a large portion was nearly solid, the section had to be extended for several inches above the umbilicus before the mass could be removed. Chronic peronitis had existed, but the adhesions were slight, except at one point, to the omentum. The left ovary was found involved with a long and rather thin pedicle.

"My friend, Dr. Sims, kindly introduced the sutures for me by his method, but unfortunately some oozing took place from the splitting of the tissues, as has been my previous experience; but after some delay it was controlled by the introduction of a parallel row of interrupted sutures, so as to secure the angles of the lacerations. This patient, however, rapidly recovered, and was discharged cured, November the 29th. Realizing that this difficulty must frequently occur when the pedicle was thin and small, I resorted to a different method of applying the wire as illustrated in the following case:—

"Mrs. S., aged 28, a native of New York, was admitted to the Woman's Hospital, November 25th, 1869. She had married at fifteen, and was the mother of four children. The first child was born two years and four months after marriage, and the last two years and eight months previous to admission. She had been in good health until the latter part of December, 1868, when the abdomen began to enlarge rapidly, with frequent and painful micturition, while she suffered at the same time from constant pain in the back and left inguinal region. The enlargement was so rapid, that at the end of two weeks after it was first noticed she was unable to wear any of her clothing which had previously fitted her, her appetite began to fail, and she soon became emaciated. Before the end of February, the tumour had enlarged nearly, as she stated, to the size presented at the time of admission. The catamenia, which appeared first at the age of fifteen, and had always been regular previous to this time, became now irregular, and of short duration, until it ceased in the following May. Just previous to admission she had arrived from New Mexico. She was much emaciated, with œdema of the lower extremities, but cheerful, and very hopeful of a favourable result from surgical interference. A large multilocular ovarian tumour filled the abdomen, extending up to the sternum, and causing the false ribs to bulge outward to a great extent. The circumference of the abdomen, on a level with the umbilicus, was fifty-two and a quarter *inches*. The distance from the ensiform cartilage to the umbilicus was *thirteen and* a half inches, and to the pubis twenty-five inches. From the

left anterior superior spinal process to the umbilicus was fifteen and a quarter inches, and on the right side fifteen inches. The mobility of the tumour was but partial. Œdema of the abdominal wall, with much thickening of the tissues, existed from the pubis nearly to the umbilicus. The linea ulba was well marked, with an unusual number of superficial dilated veins distributed over the abdominal surface. The whole abdomen was dull on percussion, with fluctuation easily detected at every point, yet varying greatly in distinctness. The uterus was high up in the pelvis, somewhat forward, but moveable, and its cavity of a normal depth. Urine normal, as were also the heart and lungs; the pulse weak—98. Tongue clean, bowels regular as a habit, but the skin dry and inactive.

"Her condition from the distention rendered an early operation imperative, and in fact the lesser evil, although much enfeebled after so long a journey, and unacclimated. The preparatory treatment was completed in a week, and consisted of a Turkish bath every other day, with five grains of inspissated ox-gall in the form of a pill, three times a day. On the third day a dose of castor oil was administered; and on the night previous to the operation a large enema of hot water, into which a portion of ox-gall had been dissolved, was thrown into the rectum, while the patient was placed on the knees and elbows. Her diet had been carefully regulated to be as nutritious as possible, in a small bulk, and consisted chiefly of strong beef-tea. Her condition improved soon in a marked degree. The œdema of the extremities was removed by rest and bandaging, and she no longer suffered from the great distension after the thorough cleaning out of the bowels, while her skin, from the use of Turkish baths, had become soft, and in excellent condition."

On the 1st of December, 1869, Dr. Emmet performed the following operation in the presence of a number of gentlemen: "An incision of some six inches was made midway between the umbilicus and pubis through the linea alba, which was very distinct in consequence of œdema of the surrounding tissues. On reaching the peritoneum it was found firmly adherent to the tumour in every direction. The main cyst, together with several others, was emptied through a common opening. By degrees the adhesions were carefully stripped off from the surface of the tumour itself, using chiefly the finger nails for the purpose. The adhesions extended from about four inches above the pubis to the diaphragm, and from five to eight inches on either side of the median line. To facilitate their separation it was necessary to extend with scissors the abdominal section upward and to the left of the umbilicus, until it reached fourteen inches in length. Although the hand was introduced into the main sac, and an attempt made to break down into it the numerous small cysts, it was found impossible to empty but a small portion of them, and with difficulty the mass was finally removed through the extended abdominal opening. The tumour was from the left of the uterus, with a thick pedicle three inches in width. The right ovary and uterus were in a healthy condition. The ether was administered by Dr. Perry, and the case required the most careful watching, as several times during the operation the shock was so great that stimulants had to be resorted to. The tumour was removed at the end of an hour and a quarter. As the mass was held up, a clamp taken from one of Chapman's ice-bags was placed on the pedicle as close to the tumor as possible, when it was severed by scissors. A section of stout silver wire (No. 25) had been prepared about eighteen inches in length, to each end of which a common coarse sewing needle had been soldered, after bending a portion of the wire into each eye. In the grasp of the clamp the pedicle had been spread out to its full width, and, as it was held up, the ligature was introduced in the following manner: Below the clamp a needle was passed through the pedicle about an inch from its edge, but before its withdrawal the needle in the other hand was inserted along its course from the opposite direction. The two needles were thus drawn through, in the same manner as the shoemaker's stich, and at the same time the wire was tightened around the included section as much as could be done, in conse-

quence of the proximity of the clamp. The needles were introduced again in the same manner, so as to divide the pedicle into three sections. With the ends of the wire in one hand, the pedicle was seized between the grasp of the thumb and forefinger of the other hand, and at the same instant of removing the clamp, by traction on the wire, the parts were drawn up tight together in two sections, while all bleeding from the third one was controlled by pressure of the thumb until the ends of the wire could be twisted. The ends of the wire were seized about an inch from the pedicle in the grasp of a pair of forceps, and carefully twisted over Sims's shield, to a point at which the integrity of the wire was still unimpaired. The twisted portion was cut off at half an inch in length, and bent over flat along the course of the ligature, so that the end was perfectly protected at the bottom of a deep sulcus. The ligature was applied in far less time than the clamp could have been adjusted, with perfect control of all bleeding, and to a pedicle which, from its size, would have been difficult of management in any other manner. So perfect was the compression, as the wire was tightened the tissues retracted from the blood-vessels, so that they projected a quarter of an inch beyond the plane of the divided surface which had been in common.

"Although the adhesions had been stripped off so extended a surface, no oozing of blood took place afterwards, except high up in the vicinity of the spleen, where the adhesions could not be separated from the tumour with the same care, in consequence of the difficulty in bringing the parts fully in view. To the bleeding points the fluid extract of ergot was applied, but it proved valueless as a styptic, and afterwards the persulphate of iron was brushed over the surfaces, but in small quantities, to avoid the formation of an insoluble clot.

"The external wound was closed by fifteen interrupted silver sutures, and were introduced far back from the edges, so as to include the peritoneum. As the oozing had not entirely ceased, high up on the left side a quantity of cotton was formed into a compress, so as to press the relaxed abdominal wall, at that point, well up under the ribs; this pressure it being thought, would be sufficient to control all bleeding. Over the whole a broad bandage was applied, and she was placed in bed, with artificial heat around her. Immediately before the operation she was weighed on a platform scales, and her weight, with that of her clothing and the table, ascertained. She was placed upon the scale after the operation, and it was found that she had lost sixty-nine pounds. The accuracy of this method was tested by carefully weighing the fluid and the mass taken away, with a difference of less than two pounds, which had doubtless been lost in the sponging. Immediately after the operation her pulse was 120 and very feeble, but reaction came on pretty promptly. At 10 p.m., as she was restless and complaining of pain in the back, a teaspoonful of McMunn's elixir of opium was given by the rectum, and she passed a comfortable night. The sutures were removed December 7th, and the union was found complete. Decemebr 9th. To this date her convalescence had been slow, but without any interruption. Small circumscribed abscesses now formed at the entrance and exit of the abdominal sutures. Their formation was evidently due to the diminished vitality of the tissues consequent upon the œdema and distension to which the parts had been subjected by the enormous size of the tumour. December 10th. Pulse 108. Up to this time no alcoholic stimulants had been found necessary, but were now ordered. During the night of December 12th, was seized with severe cramps involving the muscles of the inner part of the thigh, and afterwards in the calf of the left leg and foot. Large doses of opium were found necessary to relieve her suffering. Next morning the leg to the ankle was swollen from œdema, with an increased temperature of the parts. The limb was carefully bandaged, and in twenty-four hours she was entirely relieved. She began to recover rapidly, and in ten days the abscesses had healed. January 7th, 1870, she was discharged, having fully recovered.—*American Journal of Medical Sciences, April*, 1870, *p*, 587.

95.—CASES ILLUSTRATING THE USE OF THE LAMINARI DIGITATA TENTS.

By Dr. JOHN A. BYRNE, Professor of Midwifery to the Catholic University of Ireland.

[In the first of the two following cases it was necessary to dillate the os for the removal of intra-uterine polypus; in the second on account of the retention of a piece of ovum after abortion. Dr. Byrne considers that there are the following objections to sponge tents for dilatation, viz., difficulty of introduction, tendency to slip out, and liability to become fœtid and offensive.]

Mrs. M., aged 21, consulted me on 12th October, 1869, for uterine hemorrhage, which had continued some time. Her statement was to the following effect:—She had been married about two years, had one child in April, 1869; when she was three months nursing this child she became pregnant, aborted at three months, had a good deal of hemorrhage; after this she again became pregnant, again aborted at three months, or thereabouts, and since that time has been in very delicate health, having been scarcely ever free from hemorrhage. When she came to consult me she was very anemic and feeble from the frequent attacks. She was a healthy-looking woman in every respect, and with this exception had been always so. Before marriage she had suffered from dysmenorrhœa.

On my examining her with the speculum there was no appearance of anything which could account for this—the os uteri was healthy; on examining, however, with the finger, the cervix uteri felt rigid, the os uteri was closed, and I detected an enlargement and hardness of the uterus at the junction of the body with the cervix; the os itself was so contracted that it scarcely admitted the point of the sound, and I could not introduce it for even the smallest distance without causing considerable pain, so that I was obliged to desist. She was very hysterical, and I could not arrive at any conclusion derived from this source of examination. I told her my opinion was that there was a tumour seated within the uterus, and that it was most probably the cause of the hemorrhage, although it would be impossible then to form an opinion as to its curability. I ordered her cold lotions and ferruginous preparations; and as she then absolutely declined any more interfereace, I said I could not be of much service to her.

On the 14th inst., just two days from her first visit to me, I was hastily summoned to see her in the evening. She had been suddenly attacked that morning with flooding and had lost an alarming quantity of blood. She had tried the usual remedies—cold, vinegar, &c., but they all failed. When I saw her she was really almost moribund, her pulse was scarcely perceptible, her lips were pallid, and on looking at the bed I perceived that several large clots were lying in napkins. She was so ill that I was obliged to use the tampon—give brandy freely, gallic acid—and I thus succeeded in checking it for some days. When the tampon would be removed, it would cease for a few days, again return, and several times she was nearly moribund from the great losses which she sustained. After two or three days' cessation of the hemorrhage, she would again acquire strength, her lips would regain their colour, and she, thinking that it would no more return, would get up, move about, and then, after a short interval of freedom from bleeding, she would rapidly lose a large quantity, expelling it partly in corgula, partly fluid; treatment would arrest it for a time, but it would return. Thus from the 14th to the 30th October matters passed. I wished to explore the uterus; explained my views to her friends and husband, but I could not induce them to consent to any operation for the purpose of effecting a permanent cure. In this state of things I told them to obtain other advice, as I would no longer be responsible, and I did not see her for several days, when on the 24th of November I received a note from her husband, stating that she would consent to anything

which I proposed. I asked my friend, Dr. G. Kidd, who had seen her for me during an unavoidable absence on two days, and who entertained the same view of the case as I did, to assist me. On the 25th of November he proceeded to explore the uterus. The first thing necessary was to place her under the influence of chloroform, which was carried out effectually by Dr. Kidd for me, as it was utterly impossible to do anything to relieve her otherwise, she was so nervous and unmanageable. This having been effected I introduced a duck-bill speculum into the vagina, and seizing the anterior lip of the os uteri with a strong vulsellum, so as to fix it, the sound was passed up through the narrow and constricted cervix. In doing so there was some difficulty, which was caused by the tumour; but this difficulty having been overcome, a piece of the laminaria, about four inches in length, was passed through the os, and into the cervix; another was passed alongside this, and so on, until five of them were passed. Dr. Kidd suggested this plan, instead of using those which are sold for the purpose and prepared, on account of the latter being too short; and as our object was not only to dilate the os and cervix uteri, but also the body of the uterus, I fully concurred with him. Having introduced them nearly the entire length, I passed a small plug of cotton wadding into the vagina, and the first part of the operation was finished.

In a few hours she began to complain of pain over the uterine region, but this was relieved by a suppository of morphia introduced into the rectum.

She slept well on that night, and Dr. Kidd and I met again the following morning.

She was placed in the usual position, and the plug and tents removed.

The os and cervix uteri were so much dilated by the process adopted, that I could easily introduce the index and middle finger of my left hand. On doing so I felt a soft tumour of about the size of a grape, attached to the anterior and lateral wall of the uterus near the cervix, and corresponding exactly to the tumour felt on examination previously; it was not pedunculated, but sessile, and very soft and pliable. Dr. Kidd also examined it, and satisfied himself of its nature. Intending to pass a loop of wire around it, and extract it with the ecrasecur, I grasped it with a vulsellum, but it was so soft and pliable that it came away, and I was obliged to tear it out in fragments; any portion which I could not grasp I scraped with my nails, and having taken it all away, the interior of the uterus, where it was attached, was touched with strong nitric acid.

She recovered without a single bad symptom. For two or three days there was a dark-coloured discharge, which appeared due to the contact of the acid.

She was well in a few days. She rapidly regained strength. She had no return of the hemorrhage, and she menstruated regularly until February, when she again became pregnant, and she never has had the slightest annoyance since.

Dr. Hayden's Report.—"Shreddy portion consists entirely of fibro-plastic structure, *i.e.*, fibre-cells drawn out at extremities into fine filaments with large oval nuclei in central portion. Under strong acetic acid the filamentous portion disappeared in some measure; a few red blood corpuscles were likewise visible. The soft pulpy portion consisted of mucous exudation entangled in the foregoing structure."

On looking at those small broken pieces, which once formed a single mass, it could scarcely be believed that so small a substance could give rise to such alarming symptoms as those just detailed; but those who are conversant with such matters are aware that hemorrhage of the most alarming nature is a frequent attendant upon polypi, whether seated within the uterus or external to the os. I have myself seen very severe hemorrhage to arise from the small vascular polypus, scarcely the size of a small pea, which is occasionally seen to be seated just at the orifice of the os uteri, and we know very well the fearful flooding which proceeds from the ordinary *pedunculated* extra-uterine polypus. I have not the slightest doubt

in my mind that this lady would have died in some attack of flooding, or else that she would have gradually become exhausted from the frequent attacks, were it not that we were fortunately able, by exploration of the os and uterus, to ascertain the origin and source of it, and thus remove the cause; and this could not possibly have been effected without the aid of some substance such as the laminaria digitata, whose properties of expansion are so wonderful, and, at the same time, so innocuous.

The second case in which I had an opportunity of testing its efficacy was the following:—

On November 13, 1869, at 2 a.m., I was hastily summoned to see a lady residing at Waterloo-road. When I reached the place, I found the lady in a most piteous condition, the entire bed was saturated with blood, napkins, and everything which could be obtained were full of it; large coagula lay scattered about, and she herself was pulseless—cold—in a state almost of syncope, and, in fact, almost moribund.

Having administered stimulants, and stopped the hemorrhage, I inquired her history. It was this:—She had been some years married; was 32 years of age; had three children, the eldest of whom, a boy, about six, was with her; she had been under treatment in Dublin for some time previously, she told me for uterine complaint, and, according to her statement, had on one occasion a small polypus removed, which had given rise to considerable hemorrhage. Since then she had been aborted twice. She recovered very well after her last miscarriage, which took place about three months before; and she was going about in her usual manner. At the next menstrual period she thought that it was more abundant than usual. Soon afterwards she began to notice that she had a discharge every fortnight, then every week, and then every second or third day; rest and cold would stop this, but surely it would come on again. She began to be alarmed, and had come up from the country that day with the intention of consulting me on the following day. She was a very healthy looking woman; very large, and well formed; of florid complexion, and very strong-minded. She had been so frequently under the care of some of our best metropolitan gynecologists, that she was quite conversant with the names of all the instruments used by us.

The sudden and nearly fatal hemorrhage precipitated her intention of sending for me, and I found her in the condition which I have attempted to depict.

On examination, when she had sufficiently recovered, I found the vagina filled with coagula; but I could detect no cause for such severe hemorrhage. It was metrorrhagia evidently depending upon some internal cause. I applied a large pledget of cotton, steeped in a saturated solution of perchloride of iron, to the os—having syringed her with cold water—then plugged the vagina, administered stimulants freely, and gallic acid and ergot. Next day she was improved; there was no return, and so matters went on for a few days. I examined very carefully; there was no ulceration of any kind—simple or malignant; there was not the slightest abrasion even. I examined her with the sound; it afforded no positive information; the uterus was normal in size and position.

She soon recovered from the effects of the hemorrhage, and regained strength; but in a few days she was again attacked, and lost a considerable quantity of blood. I determined now to explore the os uteri; and, with this intention, I introduced a piece of seatangle of large size, and left it in for 24 hours. It produced no inconvenience. On the next day, when I removed it, and passed my finger into the cervix, I found a small piece of something tipping against my finger, which, on removing my finger, fell out into the vagina. I need scarcely say that there was no return of the hemorrhage. In a few days she was quite restored to health; and was delighted to get rid of her annoyance, which she examined herself.

On examination of the substance expelled, it proved to be a piece of the fœtal membranes, consisting of thickened chorion and amnion, which latter was quite evident from its white glistening appearance, and which

had remained from the previous conception and abortion. The lady has returned to the country, and I believe, but of this I am not certain, that pregnancy has taken place.—*Dublin Quarterly Journal, Aug.* 1870, *p.* 105.

96.—ON THE DIFFICULTIES OCCASIONALLY MET WITH IN THE INTRODUCTION AND REMOVAL OF TENTS.

By Dr. Laughlin Aitken, Edinburgh.

Whether the tent we intend to use be of sponge or sea-tangle, it is decidedly preferable to commence by expanding the vagina to some extent by a speculum, and for this purpose no better instrument can be found than that of Dr. Marion Sims. In the introduction of the sea-tangle it is by no means so absolutely necessary to use the speculum as in the case of the sponge tents; as the latter, however well prepared, so rapidly imbibe the fluids of the vagina, if allowed to come in contact with them, that they become soft and flexible, and consequently useless, before they can be introduced into the os uteri, and the employment of the ordinary form of Sims's speculum necessarily entails the presence of a third person, which is occasionally very strongly objected to. The use of any of the varieties of bivalve specula prevents us, of course, from grasping and drawing forward the anterior lip of the os with the tenaculum, and thus frustrates one of the principal purposes for which the speculum is required at all. For the introduction of the tents, too, we require to be provided with different instruments. For the sponge and hollow tangle tents, I generally employ the form of bent stilette, long ago recommended by Sir James Simpson; while the solid laminaria tent is more firmly grasped and more easily manipulated by a long-handled and roughly-serrated modification of the polypus forceps.

Having thus settled the preliminaries, it is by no means difficult, in the great majority of cases, to slip the tent into the os and cervix, but occasionally it happens that you meet with some obstacle to this easy entrance. The most common impediment usually arises from the catching of the point of the tent in one of the folds of the cervical mucous membrane. But this only requires to be mentioned to suggest its own remedy. Much more difficulty, however, is experienced in overcoming the real stricture which often exists at the os internum. It ought never to be forgotten that the internal or cervico-uterine orifice is the narrowest point of the canal, and that it is here that the point of the sound is most commonly arrested. In selecting the size of tent to be first used, we ought consequently to be guided by the information which a previous use of the probe has given us for the state of this orifice. In some few cases it will be found impossible to pass a tent, and then the only rational treatment is to dilate the stricture by the pressure of metallic bougies of gradually-increased diameter. I have seen two such cases in which this was the only feasible treatment. In one of them the strictured internal orifice had apparently been produced by a protracted labour; in the other, it was due to the existence of a fibrous tumour low down in the interior wall. The treatment would, of course, be similar if the stricture were at any other part of the cervix except the external os. Of spasmotic stricture of the os internum, which is mentioned as a common occurrence, after the use of the sound, by almost all gynækologists, I know nothing from personal experience. We are bound to believe that it occurs, as the weight of authority seems in favour of the statement; but I cannot think that it is so frequent an event as is supposed. Its treatment, if it form an impediment to the introduction of the tent, is obviously to chloroform your patient.

Of all the impediments to the entrance of the tent, however, the most annoying, and probably the most common, is the result of a flexion of the

body of the womb on its cervix. The internal orifice, at or near which the flexion almost invariably occurs, is thus most effectually strictured, and the position of the womb is such that it is next to impossible to introduce a straight tent. I ought here to remark, that if the flexion has been produced by adhesions of uterus to the surrounding parts from bygone inflammatory artion, a tent ought never to be used. At least, I know of scarcely any circumstances which would justify the dilatation of the cervix and body of the womb under the imminent risk of a renewal of the peritonitis. To get over the difficulty, I at first thought of employing tents bent to some extent in the same direction as the axis of the flexed uterus, but this was proved by trial to be much better in theory than in practice, as at the angle of the flexion of the uterus the tent invariably became deeply indented, and thus merely enlarged the cervical and uterine cavities, leaving a strictured part between. I now find that the only real escape from the difficulty is to employ a probe to replace the uterus as nearly as possible in its normal direction, and then to slip in the tent by the side of the metallic director.

In extracting the tent, the only common source of difficulty arises from its occasional unequal dilatation. It sometimes happens that the existence of a stricture of the cervix, whether it be at the internal os or any part, may produce such an indentation of the tent as to give it an hour-glass form. When this rather awkward result ensues, we ought never to use any great force in our efforts at removing the tent. Grasping the lower end firmly with a three-toothed vulsellum or large artery forceps, and gently moving our hand backwards and forwards with a to-and-fro motion, we can usually succeed without any great traction in bringing out the tent. A much more formidable complication I have already mentioned, as occasionally following the use of a tent which has been pushed too far within the uterus, and over which the os externum has closed. Such a result, however, can only be the sequence either of great carelessness in the use of the tent, or of the employment of too short a one; and, to avoid it, we ought never to introduce a tent under two inches in length. In extracting the tent, Sims recommended us invariably to dilate the vagina by the speculum; but this I seldom, if ever, do, and I never even use any instrument for the extraction, unless the string which is attached to the tent gives way,—a frequent occurrence, however, owing to its often becoming softened by its prolonged soaking in the vaginal discharges. The entrance of air into the dilated cervical and uterine cavities is a danger I certainly never met with, and can scarcely even conceive possible; or even if it did occur, it does not seem likely that it would produce any very injurious result.—*Edinburgh Medical Journal, Aug,* 1870, *p.* 107.

37.—ON THE VALUE OF INDIAN HEMP IN MENORRHAGIA AND DYSMENORRHŒA.

By Dr. ALEXANDER SILVER, M.A., Assistant-Physican to Charing Cross Hospital.

I am desirous of bringing the following cases before the profession, not because the discovery of the value of Indian hemp in these troublesome maladies is new, but rather because it is not sufficiently well known. It is to Dr. Churchill, of Dublin, the profession is indebted for making known the excellent effects of Indian hemp in uterine disorders; nevertheless, I was led to the conclusion independently.

A woman, whose case I regret, I cannot give in greater detail, came to Charing Cross Hospital complaining of violent pain in the loins, and of a persistent bloody discharge, the blood being sometimes clotted, and then giving rise to severe bearing down pains during expulsion. This had lasted without interval for upwards of six months, insomuch that she was greatly reduced both by the discharge and the constant pain. To get rid

of the latter, all sorts of sedatives, among others the hypodermic injection of morphia, were tried locally and generally. At the same time iron was given in considerable doses. but altogether without effect. The pain was so harrassing, that after having tried a variety of sedatives, I was induced to prescribe ℥xxv. doses of the tincture of Indian hemp, in hopes of giving some relief, and to my surprise, when she returned we were told that the medicine had acted like magic, both pain and discharge having totally ceased after a few doses. Some iron was ordered, on account of the anæmic state of the woman, and she continued under observation for a considerable time, during which she remained quite well. Afterwards her visits were discontinued, and she has not now appeared for some months. It is perhaps fair to conclude that she remains well. Some similar cases, although not of the same intensity, yielding to the remedy in an equally satisfactory manner, an inquiry was made into the history of the drug, but neither in our ordinary works referring to the diseases of women, nor on Materia Medica, was mention made of it as producing good effects in menorrhagia; at last, however, it was found that hemp had been used in such cases with very good results by Dr. Churchill. Conversing with professional friends, I have found most equally ignorant on the matter as I had been, and I accordingly resolved to collect a few cases (a few of the most recent have been selected) as the best way of enforcing the value of the remedy.

Here is a case which is typical in its way.

(a) *Case* 1.—E. C., aged 24. Married fifteen months; no family; no miscarriages. Has always been regular till she had scarlet fever in December, 1869. Since she recovered from that fever has suffered from great general debility, pain under left breast, and flushings succeeded by cold chills. Menstruates every three weeks, the discharge being sometimes scanty, at other times very profuse, accompanied by pain in the loins. Came under the care of Dr. Silver on June 10th, being at the time unwell; the discharge very profuse, and accompanied by much pain. She was ordered tr. cannab. indicæ, ℥xx., bis die, and found relief after the first dose; the discharge and pain speedily ceased.

June 13. Suffers now merely from debility. To have liq. ferri perchlorid. ℥xv., in inf. quassiæ.

June 17. No return of flow; debility still continues; much frontal headache. Iron does not suit; to have quinine.

July 5. Headache nearly gone, and much better otherwise. Flow begun again, normal. A little pain in the back. To have quinine again.

No. 2 is also satisfactory, and would have been more so had the woman been better fed; still she has greatly improved.

(a) *Case* 2.—C. H., aged 39; married twelve years; one child, aged 11 years; six miscarriages, occurring generally between the sixth and seventh month; last miscarriage last February. General health good; menstruation always regular. Husband healthy; occupation, straw hat maker. For the last nine months has lived rather low, husband being out of work. After each miscarriage discharge profuse, continuing about a week. Just before the time of the last menstruation (May 18) received a sudden fright, and immediately became unwell. The discharge was more profuse than usual, and was accompanied with pain in the loins. Came under Dr. Silver May 24th, and was ordered the tinct. cannab. indicæ. Found relief after the first three or four doses, losing the pain and discharge. Had first dose of medicine on May 24th, continued it until June 6th. Feels now very well with the exception of slight debility.

June 21. Flow recurred; scarcely any pain, only very slightly in the back; no clots as formerly.

July 5. Flow lasted nearly a week; very little pain—not more than when in usual health; has felt tolerably well since, but lacks strength; not over well fed.

(a) Notes by Mr. A. Warren.

These two cases, although satisfactory in one way, are not so striking as might be, the excessive flow not having continued so long as in the first case noted. The following is in that respect more striking, and illustrates the speedy and efficacious action of the hemp in proper cases. It will be remarked that when the discharge reccurred at the normal time the patient was in the country, and not under treatment. Had she been at the hospital she would have been ordered the hemp in smaller doses for the relief of the pain. The age of the patient is another feature in the case worthy of note, although not unfrequently the menstrual flow continues until a considerably more advanced age.

(b) *Case* 3.—A. C., aged 51, married; has been married thirty years; had six children. One child was born at the eighth month of pregnancy, lived four days after its birth. Two other children born at full time lived only a few hours after birth. Father and mother both living—father in good health, the mother bedridden. Has worked very hard as charwoman up to three or four years ago. Began to menstruate when 18 years old. Previous to that time suffered very much from pain in head, back, and side. Had her first child in her twentieth year, and the last in her twenty-seventh year. Ever since that time has been subject to a pain in the left groin. It would come and go, and was accompanied by a swelling in that region. When the swelling went, the pain went. She had then a nasty yellow discharge lasting perhaps a week. Yet during all that time she was regular to the day, and continued to be so until March 17th, when, being unwell at the time, an alarm of fire was given, and as she was the only person in the house, she was greatly alarmed. From this time up to May 10th she continued to be ill, sometimes more, sometimes less. The discharge was passed partly clotted, and with great pain. When seen first she was ordered a tonic, but that did no good. On May 10th she had tinct. cannabis ind. ℥xxv. bis die (Tuesday). On thursday the discharge stopped. Since then she has been quite well, but weak, till she went into the country. After being there a week, the flow recurred, with a good deal of pain and partially clotted; this occurred on June 4th. It lasted six days, and the pain was very severe; but the flow ceased at the normal period, and she is now (June 21st) well, but weak. To have steel.

The above cases might be called appropriate for the use of the remedy in every respect, the menorrhagia being merely functional, as we term it, and not dependent on any organic mischief. But even in those instances where there is local mischief in the shape of tumours or malignant disease, the hemp still asserts its influence over the sanguineous discharge, but only for a time. Upon the whole, therefore, if the hemp given repeatedly, each time arresting the discharge and relieving pain, but when omitted these again recur, there is just cause to suspect the existence of uterine mischief other than merely functional disturbance. Thus, in a case of uterine fibroid tumour of great size, rising nearly to the umbilicus, and, of course, elongating the body of the uterus, the periodic flow was greatly increased, and the patient was consequently much weakened; even here the hemp proved satisfactory in arresting the discharge, but not in preventing its recurrence. In another instance, where the discharge proved intractable, a small polypoid growth was discovered, and removed to the relief of the patient; but perhaps the following case exhibits those features in such a fashion as best to impress them on the mind:

Case 4.—E. M., aged 38; married seven years; no family; three miscarriages within first three years of married life, occurring about the fifth month; always healthy; husband healthy. After the last miscarriage she was quite regular till the end of last summer (1869), without any assignable reason the flow became much more frequent ndant, and was accompanied with much pain in the back, worse ju the usual period. Instead of being fluid, the flow became clotte was no special bearing-down pain. Gradually she became wea flow

(b) Notes by Mr. J. A. Lea.

came once a fortnight, and sometimes oftener. She applied to Dr. Hutcheon, of Priory Road, Wandsworth Road, Lambeth, and got relief from her pain, but there was no change in the flow. He afterwards brought her to me, when she was ordered cannabis indica, with speedy relief. She took in all three or four doses, but again the discharge returned. The remedy was repeated with a like result. The following note bears date:

June 10. After four doses ℥xx the flow again ceased, but a white discharge succeeded. She left off the medicine, and again the discharge recurred. To have cannabis and iron alternately.

17th. The cannabis has again arrested the discharge, but the flow returned soon after with clots and bearing-down pain. She has now a very great discharge, but is well otherwise. To have cannabis with ergot and iron alternately.

By this time, suspecting something more than mere functional disturbance, I was anxious to procure a more exact knowledge of the origin of the discharge, but the condition of the woman precluded anything like a vaginal examination. Still as the hemp had always been successful in arresting the sanguineous flow it was given in somewhat increased doses with the usual result.

24th. Has taken cannabis twice a day. Flow stopped completely on Tuesday. To-day was examined by Dr. Black, physician-accoucheur, Charing Cross Hospital; who found malignant disease of the cervix involving the os uteri and beginning to invade the vagina.

The origin of the discharge, both coloured and colourless, was thus accounted for.

This case serves to show how far we may rely on the drug for arresting sanguineous uterine discharges from whatever cause; it also shows that it may be employed to facilitate uterine examinations which might be otherwise objectionable.

A certain number of practitioners, I find, have been in the habit of using this remedy, especially for painful menstruation, not being mechanical. Dr. Hunt, of Hoxton House Asylum, assures me he has given it in over a hundred cases and never knew it to fail after the third dose in relieving pain and discomfort.

The dose I ordinarily prescribe is twenty minims of the tincture. It is best given in combination with aromatic spirit of ammonia.—*Medical Times and Gazette, July* 16, 1870, *p.* 59.

98.—IS IMPERFORATE HYMEN EVER HEREDITARY?

By Dr. Horatio Yates, Senior Surgeon to the Kingston General Hospital, Canada.

Not long since a respectable farmer's wife, brought her daughter to me for advice. The girl was a fine, well-developed young woman of 18. She had never menstruated, nor had ever any vicarious hemorrhage. From her physical appearance, and from the history of the case, I at once suspected an imperforate hymen. The belly was only slightly swollen, and she had the ordinary monthly constitutional symptoms, but without any "show," I found, on making a vaginal examination, a convex, bulging, elastic tumour at the orifice of the canal. After a dose of castor oil, followed by one of laudanum, I made a crucial incision large enough to admit the index finger, when there commenced to flow, in a steady stream, an inodorous, chocolate-coloured fluid, of the consistence of treacle, to the extent of forty-two ounces. The incised hymen was as thick as buckskin, and as firm as parchment. I kept her in town and in bed for four days, lest inflammatory symptoms should occur, and directed in the meantime tepid water injections slightly impregnated with carbolic acid, eight drops to the pint. The girl returned home all right, and I hear has remained in perfect health ever since.

Thus far is detailed an ordinary case of imperforate hymen, with the

common treatment; and but for what is to follow, I should not think of making a public record of it.

This girl's mother informed me that another daughter of hers, an equally well-developed girl, had been affected in the very same way as this one; had never menstruated, and at twenty her belly had become so much swollen as to induce some of her kind neighbours to suspect pregnancy. Rather suddenly, she became ill, and, as suddenly, died, undoubtedly of peritonitis. She had been seen only by an ignorant quack. I concluded that without doubt this was also a case of imperforate hymen, some of the accumulated fluid ultimately finding its way into the peritoneal cavity. And it was this fatal issue which induced the mother to make the journey to Kingston with her second daughter. These two cases might be called a coincidence. But soon after my patient had returned home, there appeared in my office her brother's wife with two female children, one eleven months and the other 3 years old, and each of these had an imperforate hymen. This was too much to be called a coincidence. This was clearly an example of an hereditary, or at least of a family peculiarity, and the more curious, from the fact of a transmission through the *father* to the next generation.

Most medical observers have noticed peculiarities of formation or malformation of one sort or other running in families. There is now a man living in this town who has six fingers (*i. e.*, five fingers and a thumb) on each hand, and six toes on each foot. He has a brother with the same redundancy, and he is the father of four children, all of whom have precisely the same redundancy. And there is also a woman living in this town who had a hare-lip, and on five of her seven children I have operated for hare-lip. The other two were unaffected, None of the five had cleft palate. Parallel cases need not be repeated, but, I doubt not, have been observed by most medical men.—*Lancet, June* 11, 1870, *p.* 833.

99.—CASES OF ACUTE LEUCOCYTHEMIA IN CONNEXION WITH PREGNANCY.

By Dr. Robert Paterson.

[It is a peculiarity of this disease, that although essentially a chronic one, upon the occurrence of some change-producing event in the constitution, such as child-birth, it is liable to assume a rabid and speedily fatal course. M. Vidal has shown that the first positive indication of the disease is to be found in enlargement of the spleen, but Dr. Paterson points out that by means of microscopic examination of the blood, its existence may be diagnosed much earlier than that period at which the splenic tumour is discernible. This is of the greatest importance during pregnancy, because there is a liability during labour to hemorrhage and that to a considerable amount. Of course to be forewarned is to be forearmed.]

If we wait for splenic or other glandular enlargements, we wait too long; they are in this class of cases recognisable only when the case is hopeless, and when they are assuming such rapid development as to lead to a speedy and fatal termination.

The first case I am about to relate—that of Mrs. S.—was the first that had occurred to me in practice, and I candidly admit I was quite unaware either of its nature or danger.

Mrs. S., aged 26, an exceedingly robust and healthy young woman, married, and three months afterwards became pregnant. I was asked to see her several times during her early pregnancy, in consequence of severe sickness and vomiting and other symptoms, all referable to that state. These symptoms, however, gradually passed away, she enjoyed good health, was plump and well-coloured, and able for the usual amount of exercise. I was again asked to see her, about a month before her confinement. She had then a very sallow look, with hollow eyes, and

rather rapid pulse (90;) but I was assured that she felt quite well,—that although sometimes slightly feverish at night, and languid in the morning, she generally felt in good spirits; the urine exhibited no trace of bile.

The labour came on at the time expected, and was natural, the uterine contractions were vigorous, and she was delivered of a healthy male child, ten hours after the commencement of labour. Very troublesome and persistent hemorrhage followed the expulsion of the placenta, which, however, was readily controlled by repeated doses of secale cornutum. For three days she continued to improve, and milk was secreted, the lochial discharge was scanty, and her pulse was high, but her condition at the end of this period was satisfactory. About the sixth day a marked change to the worse took place—the pulse became more rapid (120), there was considerable heat of skin, with increased tawnyness of it; there was decided enlargement of liver and spleen, and some slight increase in size could be noticed in the glands of the neck, along with difficulty in swallowing, but to no extent. It was soon after this that, in consultation with the late Sir James Simpson, to elicit the nature of the case, we determined to examine the condition of the blood. This was accomplished next day.

The blood thus examined presented an unusual number of leucocytes or white cells in the field of the microscope,—so much so, indeed, that not a fourth part of the globules in view were red corpuscles. The microscopic examination speedily cleared up the diagnosis. We had no doubt a case of leucocythemia before us, indicated by the state of the glands and blood, and we had as little doubt that we had an unpromising case—one that would eventually proceed to a fatal termination; but we had no idea that, within twenty-four hours from the discovery of the disease, death was to put an end to further experience or treatment. Within this space of time, the principal change which took place was that of rapid enlargement of the glands of the neck; the difficulty of swallowing, before noticed, increased much, and any attempt to swallow in the horizontal posture produced such feelings of suffocation that she jumped upright in bed gasping for breath; at last she could not lie down at all; sitting up on the edge of the bed afforded the greatest relief; and when I last saw her, she was thus seated, restless and desponding, with great enlargement of the lymphatic glands of the neck, and with total inability to swallow even a teaspoonful of water. Death took place suddenly on the evening of the eleventh day, apparently from suffocation and while sitting up in bed and gasping for breath, but with all her mental faculties clear to the last. The infant lived, and has been reared, and is now a healthy and robust child. A post-mortem examination was decidedly refused.

The case above related made me sufficiently alive to the necessity of watching cases exhibiting similar phenomena to the above, before their confinement, when I was asked to see Case 2.

Case 2.—Mrs. M'C., the wife of a policeman, was confined under the hands of a midwife, who requested my assistance, in consequence of considerable hemorrhage after delivery. As this case occurred within a few weeks of the one I have just described, and as her appearance much resembled the other, I made a somewhat careful inquiry into her history and symptoms, as well as a minute examination into the state of the patient at the time. She was a primipara. She was originally of delicate habit of body, but was strong and well when she married. She suffered much from the early symptoms of pregnancy, and especially from severe sickness and vomiting, and for long she could take little or no food. Along with these symptoms, she became pale and languid; had to remain in bed the most part of the day, and became quite unable for any active employment about the house. Towards the close of her pregnancy, she became very yellow or sallow coloured—so much so, as to induce her neighbours to declare that she laboured under jaundice; but some skilled old woman in the neighbourhood declared this was not so, from an examination of the urine. This history brings me up to the point at which I saw her after

her confinement. She had lost a considerable quantity of blood; was pale and very sallow, especially around the mouth, nose, and eyes; but the blood which she had lost did not appear paler than usual; considerable enlargement of the spleen and liver was recognised, at the time I was exciting the contractile action of the uterus. Next day at my visit, I made a more careful examination of those organs, and also of the blood microscopically. The edge of the spleen was distinctly felt more than half-way between the false ribs and iliac bone, while the liver occupied an extended space of more than two inches below the ribs, occupying fully the half of the epigastrium, besides pressing considerably upwards. There was slight enlargement of the lymphatic, thyroid, or other glands. The pulse was rapid—120; the breathing laboured; no abnormal sounds in respiration; there was a bruit along the arteries in connexion with the first sound of the heart. The child was alive, and apparently healthy. The blood in the field of the microscope was full of white cells, and after a short time the blood-discs arranged themselves into rows, while the white or rather transparent cells occupied the greater part of the field of the microscope. It is no doubt loose language to talk of the blood being full of white cells, or containing a large or considerable number, but I had really no means of calculating the relative proportions of white cells and coloured corpuscles, so that I only state generally the impression it gave me at the time. This patient got all kinds of nourishment, with iron preparations and stimulants, but she never had any secretion of milk; the lochial discharge was pale and scanty; the fever increased, the pulse becoming gradually more rapid, with greatly increased restlessness; she could not sleep, and morphia and nepenthe failed to soothe her. Gradually the fatal enlargement of the lymphatic glands of the throat and neck and upper part of chest occurred, increasing slowly, and as surely gradually cut my patient off by asphyxia fourteen days after confinement. Death in this case occurred very much in the same way as in the former one, only more slowly and exhaustively. I had repeated opportunities of examining the blood of this patient from the day after her delivery till the day of her death, and I could not recognise any increase in the number of white cells or diminution of those of the red. A post-mortem examination in this case was also denied.

Since the occurrence of the two cases above described, I have been watchful over all the cases of pregnancy I have seen, and have especially noted and examined the blood of those who presented much sallowness of skin, much languor and inability for exertion, and I have contrasted this with a similar examination of the blood of pregnant women in whom no such symptoms were to be noticed: women of healthy and ruddy complexion, and free from languor and bodily inactivity. The result has been remarkable, in so far as that, in almost every sallow case, with complaints of weakness and listlessness, and yet without any recognisable enlargement of spleen, liver or other glands, the blood has been found to be charged with leucocytes, while not a single white cell was to be seen in those of the ruddy and otherwise healthy women. Pregnancy, says M. Vidal, in four cases out of ten, is the commencement of the disease. Out of a number of cases which I have watched carefully during the latter months of pregnancy, the sallowness of whose skin, and the languor of whose system was especially remarkable, I shall give the history of one whose symptoms and the condition of whose blood gave me much anxiety, both as to the result of her labour and her recovery from it, Both the labour and convalescence have terminated favourably,—a result I could hardly at one time have contemplated.

Mrs. L. consulted me early as to the state of her health. She stated that she was about five months pregnant of her fourth child; that she had had much hemorrhage with her last baby, from which she had never entirely recovered; that her present ailments were principally languor, lassitude, and inability for any exertion, and with the exception of a slight cough, she had no other symptom of the least consequence. She presented a pale sallow complexion, with feeble and rapid circulation, poor appetite, some

morning sickness, with tendency to faint; no disease was discoverable in the chest. I had just become cognisant of the effects of leucocythemia in pregnant women, and very shortly afterwards took an opportunity of examining the blood of this patient under the microscope, and also of ascertaining the condition of the spleen, liver, and other glandular organs. This examination led me to the discovery of a large area of white cell-blood, but without being able to recognise any enlargement of the liver or spleen; there was, however, a certain amount of turgescence of the glands of the neck—a symptom which materially increased during the latter stages of her pregnancy, but was unaccompanied with difficulty of swallowing. The thyroid and submaxillary were the glands most affected. The treatment recommended was iron tonics, with stimulants, and abundance of carriage exercise in the open air. I cannot say that much improvement resulted from this means, for she continued to increase in sallowness and general weakness. At last the anxious period of her confinement arrived. I had determined to resist the use of chloroform, and to give ergot as soon as the state of the parts admitted; so, when labour advanced to nearly the full dilatation of the os uteri, I gave repeated and full doses of this drug. The result was satisfactory; the pains soon assumed a persistent character, and the child was delivered, after a labour of six hours' duration, well and healthy. The uterus contracted firmly, the placenta was thrown off naturally, and no postpartum hemorrhage occurred. Liberal diet, with wine, was allowed from the moment of her confinement, and a slow but steady recovery followed. During the period of nearly four months over which we have travelled, the state of the blood was frequently examined, and I could not say that on any of these occasions I could discover a smaller number of leucocytes than existed at my first trial. There seemed always to be about the same number of white cells and rows of blood-corpuscles. I also examined the blood lost per vaginam at her confinement, and found it to contain about the usual number. Since her confinement, however, there has been a decided diminution of white cells, her countenance has assumed a more ruddy and healthy appearance, and she has been able for some little exertion, without fatigue. Six weeks afterwards she was sent to the country, and I have heard that she is steadily progressing to complete recovery. I may state that the enlargement of the glands of the neck was somewhat persistent, not having diminished materially, although they gave little discomfort when I last saw this patient.

It is impossible for me to say what element in the history of this most interesting case is the one most conducive to practical results or to future practical guidance. My own impression is that, by saving the blood after confinement, we gained, as it were, the first step to future good results. All, it will be observed, was most unsatisfactory up to the period of confinement; but after that event, which was accomplished without prolonged suffering, and with no subsequent hemorrhage, a steady and favourable progress was initiated, and a naturally good constitution allowed a fair start towards recovery. How these leucocytes are thrown off, I do not pretend to determine; but as Virchow is clearly of opinion that they are never under any circumstances converted or changed into ordinary blood corpuscles, so we must presume that they are eliminated from the body by some other means, most probably by the lungs. Still I should suggest that other means used in this case ought not to be neglected, such as the persevering use of iron, stimulants, and other forms of nourishment, both administered before and after confinement. The effect of this disease is curious as regards the fœtus. The mother's blood was charged with leucocytes, and consequently there was a proportionate diminution of the blood-corpuscles in the maternal circulation, yet the children suffered in no way, and were robust and healthy when born. This was the result of my three cases, demonstrating as it does most clearly the important physiological fact, that there is no direct communication between the blood of the fœtus and that of the mother.—*Edinburgh Medical Journal, June* 1870, *p. 1074.*

100.—COMBINED ENUCLEATION AND AVULSION OF A FIBROUS TUMOUR OF THE UTERUS.

By Dr. J. Matthews Duncan, Lecturer on Midwifery, &c., Edinburgh.

I put on record the following case because it is a remarkable example of an operation which is not frequently performed. This procedure, which I have now many times resorted to, and always with success, consists in removing a uterine fibroid from its bed of muscular tissue by seizing and pulling by strong volsellæ. I have resorted to it only in cases in which the discharges—bloody, serous, and purulent—from the tumour were so large and so long-continued as to imperil the patient's life; and I have only resorted to it when no other means of relief seemed available. I proceed not to enucleate the tumour or separate it from its attachments and then to remove it, but simultaneously to remove and enucleate, or to enucleate by avulsion. The operation is long and laborious, and has no claim to elegance or brilliancy, being rather rude and coarse. There are, no doubt, many dangers in the operation which I have been fortunate enough to avoid, some of which I have described in former papers in this journal, but which I am not prepared here to enter upon.

The great difficulty of the operation is merely mechanical. It does not lie in the enucleation; some tumours are connected with the uterus by tissues so delicate as to offer scarcely any resistance to the disembedding force; others are united at points by strong bands of muscular and connective tissue to their beds, and these bands seem to me to be connected chiefly with the part of the tumour which is last separated; and in the operation it may be difficult to distinguish such connecting bands from a prolongation or continuation of the tumour itself. The former loosely-connected tumours come away easily, if small, and are as smooth and clean and rounded as an egg or a pear. The latter are much lacerated, especially if large, and have numerous tags and bands attached, of various dimensions and lengths.

The great difficulty of the operation is in pulling the tumour through the undilated passages. The operation, indeed, has some analogies with the obstetric forceps operation, and, like it, should not be done quickly or hurriedly. The first obstruction is in the cervix uteri, the opening also in the wall within which the fibroid is lying, and its adhesions to its bed. These three sources of difficulty combined form the first cause of obstruction. The second, and in the case of a large tumour the more powerful and embarrassing, is the perineum and orifice of the va ina, if these parts are in a natural or nearly natural state.

Mrs. S., æt. 43, had been twenty years married, sterile, enjoyed good health till somewhat about two years before the operation to be described. Then the menstrual flows became profuse, and were accompanied by pain. During the last year the bloody flux was constant and often profuse. She was under the care of Dr. Meikle, of Douglas, and had also other advice. Summoned by Dr. Meikle, I visited this patient on the 15th June, and removed a fibrous tumour weighing one pound and three-quarters. In the operation I was greatly aided by Dr. Meikle and his son.

The patient was extremely anæmic and weak, and had a bloody discharge. In the hypogastric region was a hard, rounded tumour, whose upper margin was on a level with the navel. Examination per vaginam discovered that the tumour lay high up; the cervix, dilated to fully an inch in diameter, could just be well reached by the examining finger. The os had thin rigid lips. The tumour pressed on the cervix.

To enlarge the os I cut its margin freely on each side with scissors. I then seized the tumour by a volsella, then by two, and kept pulling away, with few intermissions, except when the instruments tore their way out of the tumour. After about an hour's work, and repeated pushing back of the uterine wall by the finger, the tumour began to distend the perineum. But then further progress appeared unattainable. Continued efforts, how-

ever, brought it down a little further so as to be within reach of the knife; and I attempted to cut it spirally, but really only succeeded in making an oblique cut into it, which allowed the lower portion to come through the orifice of the vulva. To this part a strong cord was now applied for the purpose of increasing traction. At length, after the whole operation had lasted about two hours, and after some pieces had been torn away, the whole tumour was extracted; but before its separation was complete, two thick banks had to be cut through.

The tumour was everywhere raw or recently denuded, and was quite bare of capsules or any covering. Some hemorrhage took place during the operation, and continued for some hours after it.

The woman was, after the operation, in a state of the greatest exhaustion, and occasionally very faint and pulseless. When I left her, in charge of Dr. Meikle, junior, I had the gravest apprehensions as to her rallying. But she made a slow and uninterrupted recovery. She menstruated naturally in July.—*Edinburgh Medical Journal, Nov.* 1870, *p.* 390.

101.—NOTES ON THE FŒTAL CIRCULATION.

By Dr. ANDREW BUCHANAN, Professor of Physiology in the University of Glasgow.

Some physiologists have taught that the placenta produces upon the blood the same changes as the lungs—the blood being said to be black or venous in the umbilical arteries and of a florid red colour in the umbilical vein. It is easy in cases of child-birth, by some very simple experiments, to show the inaccuracy of this opinion. If, after the child is born, instead of putting two ligatures round the cord and dividing it between them, only one ligature be applied, and after dividing the cord on the placental side of the ligature the blood be collected in a tumbler or other glass vessel, assisting the flow by stripping the cord downward, then from three to four oz. of blood can easily be obtained. Now the blood is never partly of the one colour and partly of the other, but either wholly black or wholly red; and it can be obtained of either colour according to the mode in which the experiment is performed. If the cord be tied the moment the child draws its first breath and cries, then the whole blood, both from the arteries and from the vein, is black; but on allowing it to stand exposed to the air it becomes florid on the surface like ordinary blood, showing it to be quite susceptible of being acted on by oxygen if there had been any of that gas supplied to it by the placenta. We infer, therefore, that the black blood of the umbilical arteries undergoes no change of colour in passing through the placenta, but returns through the vein of the very same hue. If again the child be allowed to breathe freely before the cord is tied, then the whole blood obtained from the cord is of a bright red colour, which it has manifestly acquired in the lungs of the child before going to the placenta.

Do the respiratory movements ever occur before birth?—If the muscular act corresponding to inspiration were performed before birth when there is no possibility of air finding access to the lungs, it is manifest that the whole pneumatic effect would be to draw the blood from the systemic veins into the chest. Does nature ever employ this expedient to assist the circulation of the fœtus, either within the uterus or during parturition, especially when from compression of the cord or other cause, the progress of the blood may be impeded? I am disposed to answer this question in the affirmative, founding my opinion on a case which occurred to me twenty-four years ago. It was a case of twins; the first of which was born easily, but not so the second, for there was an interval of no less than three hours between the births of the two children. When the lower limbs were at length brought down, there was a complete suspension of *labour* for half an hour, during which the child lay with its chest in the *vagina*, and the head still included within the uterus. As the cord was

felt beating regularly and vigorously, I did not deem any interference necessary; still, however, I could not avoid satisfying myself from time to time as to the pulsation of the cord. In doing so, as my finger rested on the ribs, I was surprised to find them move, and on the movement being repeated at regular intervals, my whole attention was fully aroused, and to make my examination more sure, I placed the fingers of the other hand on the opposite side of the chest. I had then full time to satisfy myself that the ribs on both sides of the chest were undergoing alternate movements of elevation and depression, resembling exactly the rythmic movements of respiration. All this took place at a time when, from the position of the child's head within the uterus, access of air to the mouth and nostrils was physically impossible. Strong contractions now came on, and the child was at once expelled.

Were this observation confirmed, it would be important physiologically, as evincing that the reflex acts of respiration are excited by a sense of obstruction to the passage of the blood through the heart, and not by any feeling connected with the aeration of the blood and seated in the lungs, which are dormant before birth.

I need scarcely say that the question here proposed is quite different from that which has been so much discussed, of the child actually inhaling air and crying before birth.

I may add that ever since, whenever an opportunity offered, I have carefully sought for the same phenomena, but never with success, although never with a perfect correspondence of conditions in the mother and child.

Whether any similar movements occur *in utero* might be judged of from observations made on whelps still within the transparent amnion; or just extruded and placed, before they have breathed, under water, where it is well known they can live for hours.

Twins, one of which unconsciously sucked his brother's blood, and so deprived him of life.—This case occurred fourteen years ago. I can find no memoranda made of it at the time, but the history of it was so remarkable that the essential points are as fresh in my mind as if it had taken place yesterday.

The labour on the part of the mother was easy. The child first born was remarkably vigorous, drawing up its limbs, struggling and respiring deeply. It seemed to be full-blooded, the face being tumid and somewhat livid, and the whole surface having a similar hue. It cried lustily before the cord was tied, and there was no unusual delay in tying it. The other child presented a marked contrast to the first. It was pale and exsanguine. It lay fully extended, and never bent a limb, although its joints were quite flexible. It never cried, but after some time a feeble respiration was established. I could not view these appearances without some alarm, and unfortunately the idea of hemorrhage from the placenta presented itself to my mind, and I immediately tied the cord which was still beating, much to my regret on reflection afterwards. The child was kept warm, and was able to take a little nourishment. It continued to breathe feebly, and survived about thirty hours. I may add, that I never saw a more beautiful child than this; its pure white skin resembling Parian marble, and its perfect symmetry coming fully out as it lay straight and with extended limbs, an attitude in which a living child is so rarely seen.

There was only one oval placenta to which both cords were attached. I brought it away with me, and gave it to Professor Allen Thomson, who kindly undertook to examine it. He found free vascular communication throughout every part of it, so that a liquid injected through the vessels of the one umbilical cord returned readily by the other.

It is clear from this history that the child first born, by the vigorous inspirations made during his long fit of crying, filled his own vessels, both pulmonary and systemic, with blood, and so unconsciously drained off from the placenta the share of the vital fluid which should have been the heritage of his brother.

Could the circumstances have been foreseen, the cord of the child first

born should have been tied without a moment's delay, so as to prevent any undue draining of the placental veins; while the tying of the chord of the second child should have been deferred as long as possible, that is, till after the expulsion of the placenta; which should have been compressed, and the cord stripped downward towards the child.

Whenever, therefore, a child is weak from want of blood, the greater the delay in tying the cord so much the better for the child: because the umbilical arteries contracting under influence of the cold, and meeting with a greater resistance from the gradual coagulation of the blood in the capillaries of the placenta, are continuallly sending less blood thereto, while the aspirations of the child through the umbilical vein are continually becoming stronger under the influence of the oxygenated blood, and the whole difference between the blood sent to the placenta and that drawn from it tells in favour of the child. Besides which the compression of the placenta after extrusion, and the stripping of the cord downward towards the child, give an additional supply of blood, which is the great requirement. *Glasgow Medical Journal, June* 1870, *p.* 417.

102.—ON THE TREATMENT OF COMMENCING CHRONIC DIARRHŒA IN YOUNG CHILDREN.

By Dr. EUSTACE SMITH, Physician to the North West London Free Dispensary for Sick Children, etc.

[Chronic diarrhœa in young children not unfrequently begins very insidiously, owing to a slight chill, or a meal of improper food. A chronic catarrh is often induced which becomes less and less amenable to treatment the longer it continues. Frequently, however, the purging speedily ceases, and the child appears to have recovered. The motions, however, are not healthy, they are large, sour, and pasty-looking. The child gets pale, is occasionally sick, and his breath is sour and offensive. After some weeks or months, during which he has got thinner and paler, the child is seized with an attack of purging, which becomes more severe, he looses flesh rapidly, and his state becomes one of great danger.]

These cases are often looked upon as instances of disease of the mesenteric glands, but the most careful examination of the belly will seldom furnish any satisfactory evidence of glandular enlargement. The temperature is lower than in health, and seldom rises higher than 98° Fahr. in the rectum. There is no particular desire for drink. The child is a little restless at night; he takes his food with a considerable appetite, and even sometimes with voracity; the food, however, does not not nourish him, and appears hardly changed in the stools.

These cases, obstinate as they prove when not treated judiciously, will yet yield quickly to suitable measures; and unless the weakness and emaciation are very great, do not as a rule present any great difficulty in their management.

The object of the present paper is to describe the method of treatment applicable to these cases during the period, often sufficiently extended, before the diarrhœa has become confirmed; when the child is becoming more and more listless and pale, is losing flesh and strength, while his motions, infrequent but copious, exhibit the characters which have been described above.

The presence of undigested food in the motions of a young child, especially if that child exhibits evident marks of deficient nutrition, is a sign that the diet is an unsuitable one and requires alteration. Whether the digestive weakness be a simple functional derangement, or be due to the existence of organic disease, in either case our object is the same—viz., to adapt the child's diet to his powers of digestion, so that the food he swallows *may* afford him the nourishment of which he stands in need, and *may leave as little* undigested surplus as possible to excite further irrita-

tion of his alimentary canal. In such cases, however, this accurate adaptation of diet is often by no means an easy task. Articles of food on which we are accustomed to rely, and from which a healthy child derives his principal support, will here often fail us altogether. Thus, farinaceous food should be given with the utmost caution, and will seldom be found to agree except in very small quantities. Even milk, our great resource in all cases of digestive derangement, in children, must be sometimes dispensed with. It is not so very uncommon to find cases where milk, whether diluted with water, or thickened with isinglass, or with farinaceous food, cannot be digested. So long as it is taken, the pale putty-like matter of which the motions consist, and which is passed in such large quantities, is evidently dependent upon the milk diet, and resists all treatment so long as that is continued. In such cases, which occur most commonly in children between one and two years of age, the milk must be replaced either wholly or partially by other foods.

Although farinaceous food is not as a rule well borne in these cases, yet Liebig's farinaceous food for infants (as prepared by Mellin of "Liebig's Patent Concentrated Milk Company") may always be tried, and seldom disagrees even with the youngest infants. In its preparation the starch of the wheaten flour, which forms one of its constituents, is already converted in great measure into dextrine and grape sugar, so that the most important part of the work of digestion is performed before the food reaches the stomach.

Whatever be the diet adopted our object is to keep up the nutrition of the body with the smallest possible amount of irritation to the alimentary canal; and the food, whatever it may be, which will produce this result, is the food best suited to the case. Without attention to this point little good can be effected by the use of drugs alone. The successful adjustment of the diet, an adjustment in which the quality and quantity of food to be allowed for each meal are accurately adapted to the powers and requirements of the patient, is a matter which can be properly learned only by experience, and which often makes large demands upon the tact, the ingenuity, and the patience of the medical attendant. This experience every one should labor to acquire, for without it success can seldom be attained in the treatment of the chronic functional derangements of young children.

In all cases, if the patient be a sucking child, he should be limited strictly to the breast; or if he have been only lately weaned, the breast should be returned to. If from any reason a return to the breast is impossible, our great trust should be placed in cow's milk, more or less copiously diluted with lime-water. With children under a year old milk is very seldom found to disagree. If the child be no more than six months old, nothing should be allowed but milk, or some preparation of milk, as milk and lime-water (equal parts), whey with cream, or milk and water thickened with isinglass, or with Liebig's food for infants, in the proportion of one teaspoonful to four ounces of fluid. By using these different preparations a certain variety can be introduced into the diet, and the meals should be so regulated that the quantity taken on each occasion, and the length of the interval by which the meals are separated, may be properly proportioned to one another and to the state of the patient. The Liebig's food should be given not oftener than twice in the day; and if it excite flatulence, or if any sour smell be noticed from the breath or evacuations, the quantity of one teaspoonful should be diminished, or the food should be even discontinued altogether.

Beyond the age of six months a little weak beef or veal tea, or the yolk of one egg unboiled, may be added to the diet. The egg is best digested when beaten up with a few drops of brandy and a tablespoonful of cinnamon water, as in ordinary egg flip. As with younger infants, the quantity of food to be given at one time must depend upon the strength of the child and the condition of his stools.

If the child be over twelve months old, very small quantities of

farinaceous food may sometimes be ventured upon, and will often agree. The best form in which this can be given is well-baked wheaten flour, of which one teaspoonful is all that should be allowed at one time, prepared carefully with milk.

So long as milk is well borne the arrangement of the diet is comparatively an easy task; but in the not uncommon class of cases where milk is difficult of digestion, and can only be taken in very small quantities, a different dietary must be adopted. These cases usually occur in children of eighteen months or two years old. A good scale of diet for a child of a year and a half old, in whom this peculiarity is noticed, is the following, consisting of five small meals in the twenty-four hours:—

1st Meal. One teaspoonful of Liebig's food for infants (Mellin's) dissolved in four ounces of milk and barley-water (equal parts.)

2nd Meal. Six ounces of beef-tea, of the strength of a pound of fillet of beef to the pint.

3rd Meal. Six ounces of fresh whey containing a tablespoonful of cream.

4th Meal. The unboiled yolk of one egg, plain or beaten up with a tablespoonful of cinnamon water, a little white sugar, and fifteen drops of brandy.

5th Meal. Same as the first.

In this dietary the first and the fifth meals contain a small quantity of milk. If that be found not to agree, the food may be dissolved in barley-water alone, or diluted with an equal quantity of veal broth, or veal broth alone may be given. In any case the quantities recommended should not be exceeded; for it is wise, at any rate at first, to be sparing rather than liberal in regulating the allowance of food. It is better that the child should be hungry than overloaded, and so long as the stools retain their pasty character it is evident that the food taken remains in great part undigested.

If the milk agree, it can be gradually increased in quantity; and as digestion improves, which it will do after a few days of this carefully regulated diet, other articles of food can be introduced, as roast mutton underdone, and well pounded in a mortar; the flower of cauliflower well boiled in water, or stewed with gravy until very tender. In the use of farinaceous foods great caution should for some time be exercised, and they should be given sparingly until convalescence is completely established, and the stools have reassumed a perfectly healthy character.

In these cases, and indeed in all cases where a special diet is recommended for children, a dietary as given above should be written out by the medical attendant. Not only the kind of food, but the quantity to be given for each meal, and even the hour at which the meal is to be taken, should be duly set down, so that no excuse may be available for neglect or misapprehension. It cannot be too often repeated that in cases such as these it is upon the judicious arrangement of his food that the recovery of the child depends, and that where the diet is properly selected the exact medicine to be ordered becomes a matter of comparatively secondary importance. Even without the aid of drugs at all, the digestive powers would no doubt in many cases speedily right themselves under such a diet as has been sketched out above, but recovery is materially assisted by a judicious selection of remedies. It is well to commence the treatment by an aperient dose of rhubarb and soda, to clear away any indigestible food which may have remained in the bowels, after which the laxative should be followed up by a mixture containing an alkali with aromatics. It is difficult to over-estimate the value of alkaline remedies in the treatment of digestive derangements in children. In all children, in infants especially, there is a constant tendency to acid fermentation of their food. This arises partly from the nature of their diet, into which milk and farinaceous matters enter so largely; partly from the peculiar activity of their mucous glands, which pour out an alkaline secretion in such quantities. An excess of farinaceous food will therefore soon begin

to ferment, and an acid to be formed which stimulates the mucous membrane to further secretion. Alkalies are therefore useful, firstly, in neutralizing the acid products of his fermentation; and, secondly, in checking the too abundant secretion from the mucous glands. Either potash or soda may be used; of the two the former is perhaps to be preferred, as being a constituent of milk, the natural diet of children, it may be considered less as a medicine than as a food. Five to ten grains of bicarbonate of potash may then be given, combined with an aromatic, several times in the day, and it is important that the dose should be taken an hour or an hour and a half after each meal, so that any excess of acid left at the end of digestion may be at once neutralised.

If the stools are loose and are passed frequently, two or three grains of the subnitrate of bismuth may be added to each dose of the mixture, and if much straining be noticed a drop of laudanum will be a useful addition to check the abnormal briskness of peristaltic action.

It is important that the aromatic be not omitted from the prescription. This class of remedies is of very great value in all those cases of abdominal derangement where flatulence, pain, and spasm, resulting from vitiated secretions and undigested food, are present to increase the discomfort of the patient. Such dyspeptic phenomena are usually rapidly relieved by the use of these agents; and the employment of aniseed, cinnamon, caraway-seed, or even of tincture of capsicum in minute doses, will be found of material advantage in combination with the other remedies which have been enumerated.

So long as the tongue remains furred, or the motions sour-smelling, the alkali should be persisted with, and the rhubarb and soda powder can be repeated every third morning. If it be thought desirable at the same time to administer iron, the citrate of iron and ammonia, in doses of five grains can be added to the mixture. Tincture of nux vomica is also useful in one-drop doses.

The so-called alteratives are in these cases of little value, for it is no good attempting to stimulate the functions of the liver by cholagogues. Under the use of antacids and aromatics with an altered diet, food soon begins to be digested, and the appearance of the stools becomes more healthy. After a time, acid preparations, such as the penitrate of iron with dilute nitric acid, may be given with cod-liver oil.

A point which must not be overlooked in these cases is attention to the action of the skin. In all abdominal derangements in children the cutaneous secretion is apt to be suppressed early, and the skin soon becomes dry, rough, and harsh. When this is found to be the case, the child should be bathed every evening with hot water, and be then freely anointed with warm olive oil. By this means the suppleness of the skin is soon restored. Warm clothing should be worn, with flannel next to the skin; and as an additional precaution, to guard against the risk of chills, an ample flannel bandage should be applied as a protection to the belly.—*Practitioner, July*, 1870, *p.* 13.

103.—ON OPERATIONS FOR THE CURE OF VESICOVAGINAL FISTULÆ.

By T. Spencer Wells, Esq., Surgeon in Ordinary to Her Majesty's Household; Surgeon to the Samaritan Hospital, &c.

[In an operation for vesico-vaginal fistula, the first consideration is the position of the patient, and the speculum to be employed. According to Dr. Sim's plan.]

The patient is placed lying on her left side, the thighs bent nearly at right angles to the pelvis, the right rather more than the left. The left arm is kept behind and the chest turned forwards, so that the sternum is pressed against the table. A nurse or assistant, standing behind her, holds

up the right buttock with the left hand, and draws up the perineum by the duck bill speculum with the right hand, when the pressure of the air assists in bringing the parts into view.

[The disadvantage of this and of another position since recommended by Simon, is, that no assistant can hold a speculum exactly in a position deemed by the operator for any length of time, and very often at the critical moment the edges of the fistula will fall out of view. Some means of supporting the speculum in position independently of an assistant is required.]

It is evident that the support of the speculum should be fixed, not to the table or couch, but to the body of the patient, in such a manner that her movements could do no harm. I was trying to do this upon a plate of gutta percha moulded to the spine of the patient, when I went to America and saw Dr. Emmet use his well-known instrument, by which the duck bill speculum of Sims is fixed in the required position by means of a fenestrated blade, which is fitted to the buttock of the patient, who is lying in the semi prone position, by means of screws. I saw this instrument answer admirably well in Dr. Emmet's own hands, but I could not succeed with it here in any but very small women, even though I had blades of several different sizes used. Besides, it did not answer for the position on the back. While various trials were being made for me to combine the advantages of the instruments of Ulrich and Emmet, Mr. Foveaux, of the firm of Weiss & Co. (acting, I believe, upon a suggestion of Dr. Savage), altered the fenestrated blade of Emmet, so that it could be fastened upon the back instead of the hip, and connected this blade and the speculum by a screw, by means of which the speculum is held in its place. The first time I tried this instrument, with no other aid than that of Dr. Junker (who gave chloroform) and the nurse, I pared the edges of a fistula, introduced five stitches, and completed the operation.

I believe the instrument is the most useful in practice of any yet made. Mine was extremely well made by Weiss and Co., but I have seen others very good by Krohne, by Paris makers, and by Nyrop, of Copenhagen.

Neugebauer, of Warsaw, has also contrived an apparatus for use in the prone position. I have seen a fistula extremely well exposed by it by Dr. Neugebauer himself. But I prefer the lithotomy position and the instrument to which I am accustomed.

In some few cases a good and sufficient view of a fistula can be obtained by simply drawing down the anterior wall of the vagina, or the cervix uteri, by a small sharp hook, or by a thread carried through the mucous membrane, or through one lip of the cervix, while the labia are drawn outwards by a spatula on each side.

For the examination of a fistula before deciding upon the precise details of the operation, as well as for removing the sutures, nothing answers better or is generally so convenient as the semiprone position and Sims's speculum.

[illegible] I have operated several times without any anæsthetic; but [illegible] consideration of the general condition of the patient, I [illegible] to the mental and bodily suffering inseparable [illegible]. For many years past I have used [illegible] and I feel certain [illegible] while it is less [illegible] thrown well [illegible] a high window, [illegible] reflector, and [illegible] a good light without [illegible] by hooks or forceps, [illegible] a small single [illegible] passed well [illegible] to evert

or draw down, is often sufficient; but when the tissues are lax, a second hook passed into the mucous membrane half an inch or more from the edge of the fistula, puts the parts upon the stretch and facilitates the paring. This may be done by an ordinary small scalpel on a long handle, either single or double edge. But the knives most generally useful are bent at an angle of 45° about an inch from the point, and are double-edged.

One border of the fistula having been fixed by one or more hooks, it is transfixed by a straight or bent knife, which is carried first in one direction and then in the opposite until a complete ring, or the whole border of the fistula is removed. If this cannot be affected, the operator must be quite certain that no scrap of mucous membrane is left, and that two perfectly raw surfaces are ready to be brought together, or union may be prevented. Sims, Bozeman, and Emmet prefer scissors to a knife at this stage of the operation, and have scissors of different lengths and curvatures made for the purpose. This is entirely a question of habit; and I find that I can pare more exactly, and make more regular surfaces with knives than with scissors.

If an artery be divided in this stage of the operation it should be stopped by torsion. Any general oozing may be checked by injecting a stream of iced water upon the part, or by pressure with dry sponge or cotton wool. Small pieces of sponge carried on the end of long handles of wood or whalebone, or in long slender sponge holders, clear the parts from blood very well; but this is better done by a fine jet of cold water with which an assistant may follow the knife and hooks.

Passing the sutures, whether of metal or silk, may be done by small curved needles held by appropriate forceps, or by an ordinary handled needle with the eye near the point. In some cases a short needle at each end of the suture passed from the vessical border of the fistula outwards to the vaginal border becomes a very ready and exact mode of passing the silk.

Sometimes two needles may be useful. The eyed needle and silk or wire is first passed through one edge, and the notched needle through the other. The silk is caught in the notch and drawn through.

A short blunt hook, or one where the short end is bent at a right angle, becomes very useful to fix the spot where the point of the needle should emerge after traversing the second pared edge. It is pressed against the spot, and the needle at once passes through instead of pushing the mucous membrane away. When wire is used it should be drawn over the end of a small forked stem in order to avoid the danger of cutting the tissues between the point of exit of the needle and the edge of the fistula—an accident by no means rare if this precaution is not taken.

Inexperienced operators are very apt to pass their needles and sutures too close to the pared edges of the fistula. They do not include sufficient tissue to permit of firm apposition of the raw surfaces being affected without danger of the suture strangulating the included tissue, and cutting through. Simon gives a sketch to show the distance of the sutures from each other, and the distance of the points of entrance and exit from the edges; and I think he is right if both deep and superficial sutures are used. If only one row of sutures of equal depth are used, then they should be nearer together, not less than six to an inch, and need not be carried quite so far from the vaginal edge.

All the silk or wire sutures having been passed, the bleeding ceased, and the pared edges having been cleansed by a jet of iced water, the next step is to secure.

Apposition of the pared edges.—When silk is used, this is done by tying an ordinary knot on one side of the line of union.

It may be hardly necessary to state that wire should not be tied in a knot like thread or silk, as a simple twist is enough to fix it securely. This can generally be done by the fingers alone. Each end of a wire is taken between the thumb and second finger of each hand, and the forefingers are passed on close to the fissure, the edges of which are brought

together by crossing the wire. When the edges are seen to lie close together, not so squeezed that they are inverted, but simply drawn together evenly, a slight turn with the forefinger gives the first twist.

Where the fistula is so situated that the fingers cannot be used easily, Simpson's wire twister answers very well. There are two holes at the end of the shaft. One end of the wire is passed through one hole, the other end through the other hole. The wires are then held on the stretch as the twister is pushed up to the edges of the fistula till they are seen to be close together. Then two or three turns given to the handle twist the ends of the wire together. Sims uses a guard, and twists the wires by forceps. Neugebauer holds the edges together by a pair of fine-toothed forceps, while he twists the wires by a pair of long-handled pliers. But however it it is done, the simple suture, tied if of silk or twine, and twisted if of wire, fastened just tight enough to keep the edges in close apposition, is now almost universally adopted, while the clamps of Sims, the button of Bozeman, the wire-splint of Simpson, and other appliances supposed to add to the value of the simple suture, have been generally laid aside as of little or no value, or as even worse than useless.

Before removing the patient to bed it is always advisable to ascertain if the fistula has been perfectly closed, by injecting a few ounces of water into the bladder, and by passing a fine probe between each of the stitches. If a probe passes into the bladder at any point, or if the water escapes from the bladder, one or more additional stitches should be introduced. I feel convinced that inattention to this precaution has been often a cause of failure. Simpson used milk, as more easily detected than water, if a little trickled through any opening.

The Treatment after Operation commences with placing the patient in bed, lying on one side on a water-cushion, with the thighs bent up towards the abdomen. She may change from one side to the other as she desires. Then the chief question is whether a catheter should be left in the bladder, or should be used every two or three hours, or should be dispensed with altogether if the patient is able to pass her urine voluntarily. For some years after the improvements of Sims had been adopted here, the catheter was considered an essential part of the after-treatment. If the bladder were not kept empty it would distend, the united edges would be pulled apart, urine would dribble between them, and failure ensue; therefore a catheter was kept in the bladder, and it was carefully watched by a nurse to see that it did not become plugged with mucus or deposits from the urine. She was supplied with two, one to use while the other was being cleaned, and she had wire stylets and syringes to clear the channel. Various forms of metallic, elastic, or vulcanite catheters were used, with or without flexible tubing attached. The short curved silver catheter of Sims was that generally preferred. I have had them made extremely light, of albuminum and also of vulcanite, the latter being generally preferred by patients. But objections to the use of the catheter soon arose. Irritation and cramp of the bladder were set up, or the catheter became plugged and the bladder distended, while the constant watching was irksome both to patient and nurse. It was observed that when the catheter had become useless by plugging, or had been carelessly or accidentally removed, a good result was sometimes obtained; and I had expressed my opinion at more than one of our societies and publicly in the hospital, that the use of the catheter was not an essential part of the after-treatment, before I received Simon's elaborate disquisition on the subject. He has brought forward numerous experiments and strong arguments to prove that normal urine is by no means the irritating and injurious fluid it is supposed to be—that it is only when alkaline or putrescent that it becomes acrid or poisonous—and that equally good or better results are obtained in the cure of vaginal fistula when no catheter is used in the after-treatment, provided the patient has the power of emptying the bladder, or is only used at intervals of a few hours until the patient regains this power.

I have followed both plans, and have met with success and failure under

both; and my present practice is to introduce a small vulcanite catheter, curved like that of Sims's, immediately after the operation, and to leave it as long as the patient does not complain of it, and no irritation of the bladder is set up; but on either of these signs being observed, the catheter is at once removed, and is either used every two or three hours, or not at all, if the patient can empty the bladder without effort. I have twice tried the short catheter of Dr. Dawson, which, from its bulbous extremity, becomes self-retaining, and which admits of the patient moving about while it is worn; but I found it quite as irritating as others, and the patient was kept extremely uncomfortable by the dribbling of urine.

If the patient suffers from pain or restlessness, opium may be given alone or combined with belladonna. A plain nourishing diet is given, and simple diluents may be taken freely.

If the patient is dry, no urine running down from the vagina, it is not advisable to run any risk of disturbing the parts by any examination for six or seven days. Dribbling of urine from the vagina, or profuse mucopurulent discharge, are almost certain signs of failure. If these be shown, it is generally advisable to relieve the patient from her irksome position, and remove the stitches. If all go on well, silk sutures may be removed on the sixth or seventh day; wires may be left till the eighth or tenth, or even longer, if union does not appear to be firm. One great advantage of silk sutures is the ease and safety with which they are removed. Wire is much less easily removed without risk of separating the recently united edges. It is seldom necessary to fix the patient as at the operation. She may be placed in the semi-prone position, and the part exposed by Sims's speculum. Each suture is seized by forceps; is drawn to one side, and divided just where it emerges on the opposite side. The patient should remain two or three days longer in her room, and the catheter may be used occasionally. If the urine is ammoniacal or loaded with mucus, the bladder may be gently washed out with warm water once or twice a day, using a double-current catheter, which is arranged to throw the stream of water over the floor of the bladder.

When the fistula has been of some years' duration it may be some months before the bladder will contain more than a few ounces of urine. But the cure is ultimately complete. In recent cases the patient often recovers complete power over the bladder in a few days after the removal of the sutures, and I have seen this also in some cases of old standing.

When union has not taken place at all, or only partially—in other words, when the operation has failed—two or three courses may be adopted. First, if the ununited edges of the opening, when cleared of urinary deposit, appear to be covered by healthy granulations, the sutures, may be at once reapplied, or the granulating surfaces may be held together by *serre-fines*. I have known this to prove successful more than once. Secondly, if it be undesirable, either from the local condition or general health of the patient, to subject her at once to further confinement in bed, she may be allowed to go about and use some astringent vaginal injection two or three times a day. Tannin dissolved in glycerine and water is perhaps the best. If granulation goes on, the patient may be again placed in bed, and the catheter used, tannin being applied daily to the granulations. This seldom leads to complete closure, but I have seen it occur twice, and one was a very obstinate case of twenty-three years' standing. Thirdly, if neither of these processes appear likely to succeed, the patient should go to the country, and return after some weeks for a repetition of the operation.

The above account may suffice to describe the operation in any ordinary case of vesico-vaginal or recto-vaginal fistula. When the uterus is involved in the injury, and a vesico-utero-vaginal-fistula has to be treated, it entirely depends upon the extent of the injury if the opening can or cannot be closed without also closing the os uteri. Sometimes this must be done, the posterior lip of the cervix uteri being united to the neck of the bladder. In this case the woman is rendered sterile, and the menstrual fluid passes

into the bladder, and is evacuated with the urine. I have done this three times with complete success, no inconvenience resulting from the unusual course of the menstrual fluid, and the supposed danger of urine passing up along the Fallopian tubes to the peritoneum being purely imaginary. In many cases the anterior lip only of the cervix uteri may be used to close the fistula, leaving the cervical canal free.—*St. Thomas's Hospital Reports, Vol.* 1, 1870, *p.* 307.

104.—ON THE TREATMENT OF PUERPERAL CONVULSIONS BY CHLOROFORM AND BARNES'S DILATORS, WITH NOTES OF A CASE.

By Dr. ALFRED WILTSHIRE, Junior Physician to the West London Hospital, and Physician to the Samaritan and British Lying-in Hospitals.

[How useful chloroform may be in cases of puerperal convulsions, in conjunction with artificial dilatation, the following case shows. In July, Dr. Wiltshire was called by Mr. S., to see with him a young woman, florid and robust looking, who was in labour of her first child. The labour began by convulsions, and during the first seven hours there were fourteen fits.]

I found the patient insensible, with a dusky countenance, and breathing rapidly. Both pulse and respiration were extremely accelerated; the former being 180, the latter 80, per minute. On taking off her stocking I found both legs œdematous. On examining the head I observed a purulent discharge from the right ear. By the time I had done this a fit commenced. It began on the right side, and, when fully developed there extended to the left, the whole body being involved in one frightful convulsion.

On examination, per vaginam, the os uteri was found to be dilated about the size of a florin; the cervix was somewhat unyielding; the membranes were entire; head presenting; uterine contractions frequent. A very small quantity of urine (about ʒj) was withdrawn by means of the catheter. There had been a considerable quantity of water passed in the bed. Some urine subsequently obtained was found to be highly albuminous.

I recommended that chloroform should be exhibited immediately, and that the patient should be kept more or less under its influence continuously. This I advised with a view to checking the fits, which it did efficiently. Then came the question how delivery could best be expedited, that, obviously, being a point of great importance. It was clear that the dilatation of the os uteri were left to the natural efforts, a considerable time must elapse before turning, or the forceps could be resorted to. I therefore advised its rapid dilatation by means of a Barnes's air-bag. This was quickly done, and the labour was forthwith completed by the forceps, a dead child being extracted. The patient had three fits during the night after the withdrawal of the chloroform; regained consciousness next day, and then made a rapid and perfect recovery.

Apart from highly interesting considerations as to the etiology and pathology of the foregoing case, there are two practical points in the treatment of it which are very instructive. The first is that in chloroform we have an agent capable of arresting and keeping in check the convulsions, which of themselves might kill. This, to the obstetric practitioner, is no small boon. To have it in one's power to arrest and avert the hideous convulsions, which are so terrifying to non-professional beholders, is a gain; and still more is it a gain to be able to prevent the exhaustion consequent upon so great a waste of tissue, and the damage which must accrue to the nervous centres from repeated and quickly recurring fits. Moreover, death unquestionably does sometimes occur during a convulsion. On all grounds, therefore, it is important that the fits should be stayed. This (I speak from observation) chloroform will generally enable us

accomplish; meanwhile time is gained for other methods of treatment, with which, as a rule, it need in no way interfere.

The second point is also one of great importance: it has reference to the means whereby labour can be expedited.

Nothing can be more grievous to the medical man than having to wait idly and helplessly by a patient whose safety depends upon the rapid termination of her labour—a consummation which, however earnestly he may wish it, he may deem himself powerless to promote. Any one who is familiar with the subject, will know how often anxious hours are spent by the medical attendant in watching the progress of a labour, upon the speedy completion of which the safety of his patient and the life of her infant depends. Too often, under such circumstances, uncalled for, not to say violent and injurious, measures are resorted to, inactivity appearing blameable.

It will, I am sure, be no small comfort to those of my professional brethren who may be placed in such a strait, to have within their reach a means of treatment as simple and harmless as that afforded by Dr. Barnes's air-bags. With them there need be no difficulty in rapidly dilating the maternal passages, and in this way the speedy termination of the labour may be secured.—*Practitioner, Nov.* 1870, *p.* 267.

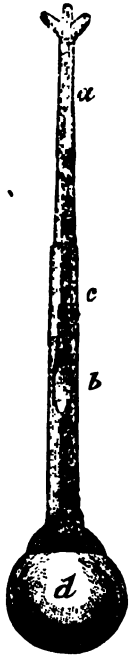
105.—TREATMENT OF SORE NIPPLES BY NITRATE OF SILVER.

There are few sources of suffering, of an apparently trifling nature, productive of greater misery, than chaps, abrasions, and inflammation of the nipples, in nursing women. For a long time, I tried all the measures usually recommended, both regular and empirical, to cure them; but I never had any reason to congratulate myself on my success. I hear daily of the distress occasioned by such accidents; and having at length fallen on a method of treatment which never fails to give immediate relief, and ultimately to effect a cure, I cannot withhold it longer, lest there be even one practitioner in extensive practice who may be unacquainted with it, and so lose the benefit of a remedy which I regard as a blessing to every woman in the condition before mentioned. Indeed, under my impressions of its value, I should be culpable in not making it known. Many, perhaps, may know it; but there are certainly many who do not, much to the loss of their puerperal and nursing friends and patients; and for the sake of these I may be excused for troubling you. My method is briefly this: Having gently, but carefully, dried the nipple, touch it freely with a sharp pencil of nitrate of silver. Be sure to insinuate the pencil into the chaps or chinks; then wash the nipple with a little warm milk and water. In most instances, the pain, though smart at first, soon subsides, and a little simple ointment, or one made with the flowers of zinc, is all that is requisite to heal the sore. I occasionally wash the nipple with a saturated solution of borax, before and after suckling the infant. Some suffer a great deal of pain from the application of the caustic; this must not be heeded. A draught, containing an opiate, such as sol. mur. morph. 30 drops, soon brings relief, and the part is presently easier. Some require to be touched more than once,—nay, several times; but each succeeding time it is less painful. I have heard of a solution of nitrate of silver being tried: I can positively assert that it is inferior to the solid caustic, both in relieving and healing these painful affections.—*Journal of Cutaneous Medicine. June*, 1870, *p.* 68.

106.—SORE THROAT IN CHILDREN.—AN INSUFFLATOR.

By S. Messenger Bradley, Esq., Manchester.

During the recent epidemic of sore-throat which prevailed extensively in Manchester and the neighbourhood, I have been in the habit of employing dry powders to the throat instead of gargles; and, I believe, with a more satisfactory result than is derived from the latter.



Children cannot gargle; and some grown-up people even labour under a like disadvantage. Gargles are not brought very thoroughly into contact with the back of the pharynx, which is sometimes the chief, at other times the sole, seat of mischief. Some gargles injure the teeth; others are extremely nauseous; none are saturated solutions, and therefore none are such powerful local astringents as are the drugs themselves in a finely divided form. For these reasons, therefore—for the superior potency of the dry powder, for the increased rapidity of cure which it affords, for the greater accuracy with which the remedy can be localised, and for its universal applicability in cases when local means are indicated—I advocate dry insufflation in preference to the use of gargles.

Whatever powder is selected may be very conveniently applied by means of the instrument which is here engraved. Its use is simple enough, and may be safely entrusted to an intelligent nurse during the absence of the medical man. The powder is introduced into the tube through the aperture *b*, which is then covered with the sliding lid *c*; the tongue of the patient being depressed, the branched silver end of the tube *a* is passed towards the point against which the powder is to be directed; and the elastic ball *d*, being compressed by the thumb, the powder is directed with perfect accuracy against the desired spot.

I have employed the following powders and have found most of them useful: alum, rhatany, tannin, catechu, borax, guaiacum, acetate of lead, calomel, sulphate of copper, nitrate of silver.

The insufflation should be repeated from once to five times a day, according to the severity of the case. If the nitrate of silver, or calomel, or sulphate of copper, be used, from a quarter to half a grain should be mixed with five grains of pearl-powder; in the case of the other drugs, about five grains should be employed at each insufflation.

The instrument is made by Messrs. John and William Wood, Manchester.—*British Medical Journal, June* 25, 1870, *p.* 651.

ADDENDA.

107.—ON PREVENTION OF DANGER FROM CHLOROFORM.

By Dr. Benjamin W. Richardson, F.R.S.

A certain mortality from chloroform admitted, we ask, in considering how to reduce this mortality—Are there any means by which we can lessen the danger of death? The question in general brings before us several questions in particular, which we will take up *seriatim*.

Condition of Patient.—Can unusual danger be predicated from the condition of the patient? This is a point I am constantly consulted upon. But last week I had two cases before me for advice on this one subject. Well, while I dispute altogether the dogma that whenever an operation is justifiable chloroform is justifiable, because there are numbers of useful operations for which it is unjustifiable, I am not prepared to bring any dogmatical rule against chloroform founded on the condition of the patient. Sometimes persons die under chloroform who have no appreciable disease whatever before death—no disease, that is to say, which the most perfect diagnostician could put his finger on and say there was cause of anxiety from the presence of disease. In the only real case of danger I ever had—in the only case where I thought life really was extinct (happily I was wrong)—the patient was one of the most perfect specimens of a healthy body I ever remember to have seen. It was the case of a young lady who had from her birth been in health; she was free from the least affectation. She came under the influence of the narcotic with the utmost ease, the operation—the extraction of a tooth was skilfully and quickly performed, and a full minute after the chloroform had been withdrawn, the breathing was tranquil, the pulse steady, the countenance natural. Never was a moment when there was less cause for anxiety under the same circumstanc; when suddenly there were lighted up all the phenomena of death—the respiration became imperceptible—the heart inaudible, the limbs flaccid. Fortunately, the heart, feeble as it was, continued, and, after three hours of anxious waiting, the recovery was completed. But an hour before I had administered chloroform to an aged lady for a much longer time, and had seen no symptom whatever of danger. The same specimen of chloroform (I mean, of course, a specimen out of the same bottle) was used, the same mode of administration was followed, the same hand administered; and yet how different the results. They were results, which I think could not be predicated; they were results which I, at all events, had not the sagacity or knowledge to predict at the time they occurred, in 1860, and which now would be as far from me as ever.

There is a fact I have learned, moreover, in experiment bearing on this same subject, and which deserves notice. I have occasionally had two animals of the same age, breed, and condition in this glass chamber, breathing at the same time and for the same time the same atmosphere of chloroform and common air. They have become narcotised by the vapour, and when I have proceeded to remove them I have found one dead and the other alive and apparently free of danger. This is a result which I think could not possibly be foreseen.

We turn from natural to diseased conditions of body, and the difficulties continue. I believe I know of one condition of body which may be diagnosed as specially dangerous for chloroform, and there my knowledge is brought to an end. This unfavourable condition is present when careful diagnosis shows the existence of a weakened and dilated right side of the

heart, with enlarged hemorrhoidal veins, varicose veins of the lower extremities, and large, full, yet not tense, veins in the other parts of the body. In the body thus circumstanced we may be certain that the right side of the heart, which is the most important organ to be sustained in action under chloroform, is already half dead, and will readily succumb if subjected to further injury.

Beyond this point of diagnosis I repeat I know nothing definite. When I was engaged in the practice of the administration of chloroform I was careful to make diagnosis of disease before administration of the narcotic, and on referring to the facts I find I administered in the presence of the most extreme forms of organic disease. In phthisis pulmonalis in various stages; in cancer in various stages and types of the malady; in chronic bronchitis, asthma, hydrothorax; in mitral disease, hypertrophy, dilated aorta; in epilepsy, in idiotcy with epileptic disease; in various forms of dropsical effusion; in paralysis and acute mania; in some acute diseases, such as croup and pertussis; and in disease of the kidney with albuminous urine. In not one of these administrations has it appeared that the danger of administration was in any sense increased. But my own experiences are small when compared with those which Dr. Snow has written in his book of recorded cases, and he came to the same general conclusion as has been expressed above—a conclusion affirmed, I believe, by all who have become practically conversant with the subject.

Some observations have been made relative to the influence exerted by chloroform on persons of the different sexes and on persons of different ages of life. The evidence in respect to sex is affirmative of no special fact indicating that either sex is subject to peculiar danger, but in the matter of age it has been affirmed that the young are exposed to less danger than the old. It is true that in the lower animals it is easier to resuscitate from apparent death a young than a middle-aged or old animal, and it has been assumed, on the statistics of fatal cases in the human subject, that fewer deaths have been recorded in the young than those more advanced in life. But, for my own part, I am unable to come to any satisfactory conclusion; for I find that young inferior animals are quite as easily killed as older animals, and, respecting the statistics, the evidences are faulty in the main point, inasmuch as no comparison has been made of mortalities in a given number of administrations. When we consider how many more adults and middle-aged and aged persons, massed together, are made to take chloroform than young children, we cannot reason on the subject—in short, a sufficient number of deaths from chloroform have not yet been accurately tabulated to allow of any safe inference to be drawn from them. We may, therefore, leave this question of age and its influence an open question, and wait for further information. Lastly, the effects of mental influence and habit have been considered in relation to the action of chloroform on the body. Snow made a very sound observation on this point which I have often seen proved as true; it is that persons of strong muscle and athletic power are brought under the influence of chloroform with much more difficulty than are persons of weak, sensitive natures, and of refined and highly cultivated minds. It does not at the same time, follow that the danger in one of these classes of these cases is greater than in the other, for those who come readily under the influence of chloroform are subjected to a smaller dose than the stronger class, and this compensates for what might otherwise be a greater danger.

On the whole the only diagnostic I could give as warning the practitioner from exceptional danger from chloroform, is the diagnostic of dilated and weakened right heart, with the other attendant symptoms already explained. If I have one further misgiving in respect to dangerous cases, it relates to cases of kidney disease with albumen in the urine, and disposition to uræmic sleep. Here, however the misgiving is based on theoretical reasoning alone, and is greatly negatived by the knowledge we have acquired from practical observation.

Preparation of the Patient.—The state of the patient preparatory to

administration admits of being discussed in respect to danger of administration. It may seem childish to insist that a person under chloroform should enjoy the most perfect muscular freedom so that the breathing may be naturally performed and the circulation left unimpeded. In plain truth is it not childish to enforce these rules, for they are constantly broken. In some operations, as in removal of the jaw, some surgeons still carry out the plan, necessary before the days of anæsthesia, but more than unnecessary now, of binding the upper limbs of the patient to the trunk. In other cases tight clothing is allowed to envelop the trunk of the patient. and frequently many bedclothes are allowed to rest on the abdominal muscles. Further, it is no uncommon practice when, in the second degree of narcotism, the patient struggles, to use force to restrain movement, instead of pushing on the chloroform to the third, quiescent, and much safer degree of narcotism. Now all these proceedings, negligences, or practises, are essentially dangerous; they are not trifles. It should be ever remembered that the living body under chloroform is a body more than three parts dead, and that such power as still remains in the organs, all essential to life, is itself so reduced that the smallest untoward circumstance may turn the scale towards death. Perfect freedom for respiratory movement is consequently a vital preparation for the administration of chloroform.

The *position* of the patient has been often dwelt on, and it, too, is important. The sitting position is certainly unfavorable for the heart, and the perfectly recumbent position is unfavorable in many ways. It interferes with free respiratory power, it allows fluids accumulated in the mouth to fall back to the throat, it allows the tongue to fall back, and when vomiting happens to come on it enforces the necessity for raising the body. For all these reasons the semi-recumbent position is the best, as it is the most convenient. To this recommendation as to the position it is essential to add another, viz., to keep the body from the beginning to the end of the administration in the same position without any upward or downward movement. We find in deeply narcotised animals nothing so detrimental as movement of the body. Left at perfect rest, we may narcotise an animal until the inspiratory act of respiration ceases, and yet the animal may recover; but at this crisis the smallest movement, the merest handling of the body, will prevent all chance of return of power. The same rule holds good when an animal is being resuscitated from chloroform; after the first gasp of inspiration proclaims returning life, rest is absolutely essential to successful recovery. Precisely the same rule holds good with the human subject; yet so little is the fact known that when there are symptoms of collapse it is the most common of practices quickly to lift up or quickly to lower the body. The practice seems of little moment; it may be of infinite moment. In saying this I do not raise objections to the plan of turning the patient once gently over to the left side, as Mr. Bader so strongly recommends, for that I think at first is a good and commendable plan. I speak of the raising and lowering of the body and the exercise upon it of strong and sudden pressure.

In considering the preparation of the patient for chloroform, a word should be said about *food*. Experience has taught unmistakeably that chloroform should never be administered to a patient whose stomach is charged with food. Persons so circumstanced usually vomit, and, moreover, are readily disposed to become faint. On the other hand, it is very bad practice to administer chloroform to a person exhausted from long deprivation of food. An interval of three hours is sufficient after food, and a longer interval is, I think, injurious if the food last taken be carefully selected. The best food that can be given before administration is, for an adult, a breakfeast cup of beef-tea made with Liebig's extract, and charged with grated toast or biscuit. Opinions vary as to the propriety of giving alcohol immediately before administration. If we could put a free quantity of alcohol into the blood before commencing administration, the introduction of the chloroform would be expedited; but the mere act of giving a glass of sherry cannot have any physical influence. The practice

is notwithstanding, good in cases where it is required; it is *morally* good, and when a nervous patient asks for it or is pacified by having it offered, a glass of sound wine should never be witheld. Dry sherry is the best wine on these occasions.

I have not yet said all about the preparatory treatment. As it is bad practice to administer chloroform when the stomach is loaded with food, so is it equally bad when the bowels are loaded with fæces, or when they and the stomach are distended with gas. The surgeon should never allow a patient to be put under chloroform without previous inquiry as to the condition of the bowels, or without, if he find them loaded, the administration of a gentle purgative. A few grains of grey powder and scammony, followed by an aloetic draught, a day previous to the administration of chloroform is a most valuable preparative for those in whom the diaphragm is impeded in its free action by constipation and flatulent oppression.—*Medical Times and Gazette, May* 14, 1870, *p.* 518.

108.—ON DEATH FROM CHLOROFORM.

By Dr. Benjamin W. Richardson, F.R.S.

[The question of the best mode of administration of chloroform has, since its discovery, been a fertile source of controversy. Sir James Simpson from first to last reasoned against complicated methods of administration, whilst, on the other hand, the idea of Dr. Snow was, that, given a perfect instrument for inhalation no deaths ought to occur. He considered that the inspired air ought not contain above four or five per cent. of chloroform, this being quite sufficient to produce perfect anæsthesia. Against this it may be said that in practice this amount of dilution of chloroform vapour has not been found to insure absolute immunity from danger.]

The most extreme successes have attended administrations which have been conducted without the assistance of any method for measuring per centage of chloroform. In the seventeen thousand cases I have recorded as occurring before a death was chronicled, the mode of administration was as varied as could well be imagined. Suppose, however, one particular instrument or method had been alone employed in this number of cases, what would have been said of it? It would have been raised to an estimate as priceless as fabulous. In two of the largest Hospitals of the United Kingdom there is no record of a death from chloroform, and yet in neither of these institutions has an apparatus for the measurement of chloroform been employed. On the whole, were I inclined to follow up the question sharply, I might urge, on fair evidence, that there have been more deaths from chloroform in cases where an apparatus for adjusting the quantity of chloroform has been used, than in other cases; but this again would be false to nature, as implying that proportion of deaths bears some relation to mode of administration. We will therefore pass on our way, content to know that the natural facts dispel the illusion that in any particular known method there is a special security from death.

Can we then by any reasonable hypothesis explain, apart from method, the cause of the many and frequent deaths from chloroform? There seems to me a most reasonable hypothesis which does account for the facts. The hypothesis is simple; it is that in every case where a person has to be made so dead to the outer world that he neither sees, nor hears, nor thinks, nor feels,, but hangs on to the mere threat of involuntary organic function and action, he is dead in every part except in the mere parts which remain true to involuntary organic work, and that as in all persons, these necessary parts are not equally sound, therefore some persons succumb. If this be true it is not on the per centage of chloroform inhaled that either safety or danger in a given number of cases of administration rests, but on the per centage of organically sound or

unsound persons who are subjected in a given number of cases to the vapour of chloroform.

Still there remains one other consideration. It is acknowledged to be necessary for an operation to induce such a degree of insensibility as shall constitute perfect anæsthesia, and it is very near to the exact truth to assume that to produce this degree a certain given quantity of chloroform must enter the body whether it enter quickly or slowly. We ought to consider, therefore, whether it be safest to introduce what is required quickly or slowly. There is no possible experience on the human subject that can be to us the poorest guide on the particular question here raised. But on inferior animals we can study the question with precision, and without subjecting them to pain can arrive at a very satisfactory result. I have studied by this method, and will put before you the facts under two or three heads.

First, then, I find, and I will demonstrate the fact by experiment at a later period, that a warm-blooded animal subjected suddenly to vapour of chloroform at a temperature over 70° Fahr. will often cease to breathe and to circulate blood, at once; will die as if from sudden apnœal syncope. I think we now know what, in these cases, is the cause of death. It is not from the absorption of vapour of chloroform into the blood. No! it is from the direct action of the vapour on the nervous system. The stimulation excited by the vapour causes the animal spasmodically to cease to breathe, then follows the apnœa and arrest of the action of the heart.

Dr. Rutherford in his most able and suggestive paper, in the *Journal of Anatomy and Physiology*, for May, 1869, "On the Influence of the Vagus on the Vascular System," touches on this subject incidentally, but not less forcibly. He remarks, "if any irritating vapour be brought before the nose of a rabbit, it instantly closes its nostrils and ceases to breathe, often for thirty to forty seconds. Within three seconds after the cessation of respiration, the heart comes almost to a stand-still, and continues to beat very slowly until respiration be re-established. The arrest of the heart is due to stimulation of the inferior branch of the vagus by the asphyxiated condition of the blood, for the slowing of the heart does not set in until death approach, if the vagi have been previously divided."

Dr. Rutherford's explanation of the arrest of respiratory and circulatory action, under the circumstances named, leaves, as it seems to me, nothing to be desired, and, as I have said, animals (I refer to rabbits specially) sometimes die straight off from this sudden arrest of action of the respiration and circulation.

Have we in the human subject the analagous mode of death? Distinctly. In Snow's table of fifty fatal cases, it is recorded that nine of the patients died within the minute after the commencement of inhalation, and four of these within a few seconds. Various opinions have been adduced to account for such rapid deaths. Some have urged that the deaths are from fear; others, that they are from rapid absorption of the chloroform. The explanation seems simple enough on physiological grounds. The patients have died from the direct action of the vapour on the nervous periphery of the breathing surfaces; they spasmodically ceased to breathe, and the vagus being stimulated by the asphyxiated blood, the heart also ceased to circulate blood. In this same way persons have undoubtedly died under the influence of sudden fear.

The moral of this point is of deep interest, and has at least two meanings. It tells us that chloroform, being a direct irritant, is, in that sense alone, an objectionable narcotic vapour, and it tells us further that it is a bad practice to commence its inhalation too abruptly, or to force on narcotism *rudely* against time. The same observation extends to other agents than chloroform—it extends to all bodies of the same family. Chloride of methyl and bichloride of methylene also act as direct irritants, and are also dangerous when used against time. At this moment there is, nevertheless, a practice of producing instant anæsthesia for short operations by the rapid pushing of bichloride of methylene, so that the patient is made

insensible in twenty or thirty seconds. There has as yet been no death from this method, but I am bound to say that an occasional death from it is simply inevitable. One day a frightened woman or an irritable nervous man will take a few inhalations of the vapour, will hold the breath until the heart stops, and will die. And pray observe the truth, that in this form of death it is not the quantity of vapour actually condensed in the blood that kills; the killing is by a primary impression on the peripheral nervous surface from the vapour, and by a secondary excitation of the vagus and arrest of the action of the heart from asphyxia of the blood.

On the whole it is a bad, and likely to be a fatal, practice, to push on narcotism by chloroform against time. In the cases of scared women, feeble children, and irritable and resistent persons of both sexes, the danger of administration is always present until the mind is assured if it be faltering, or tranquillised if it be excitable.

Bearing still on rapid death from chloroform is another observation worthy of notice—viz., that if the lungs be suddenly charged with chloroform vapour, there is induced often a quick contraction of the pulmonary arterial vessels. The lungs under these circumstances appear suddenly blanched as snow, and the right heart is instantly paralysed from pressure of blood which continues to flow into it, but which cannot be forced into the pulmonary circuit. In these cases there may be one or two efforts at respiration even after the action of the heart seems to have ceased; but when the body is laid open and the heart is exposed to the air there is always some after-action of the auricle and ventricle from absorption of oxygen by the contained blood and renewal of muscular irritability. There are many cases on record of death in the human subject where the facts point definitely to this mode of death, and, again, suggest the impropriety of narcotising by violence of administration.

We want to know, lastly, in respect to rapid death from chloroform, whether the vapour ever acts directly and primarily upon the heart itself, through the lungs. In investigating this point I have never been able to satisfy myself that in an animal with a perfectly healthy heart, the heart can be arrested in its function by the vapour of chloroform administered through the respiratory surface in any other ways than those described immediately above. At the same time it admits of the readiest demonstration that the heart may be instantaneously arrested in its motion if chloroform be brought into it directly by the blood. To prove this we have to inject with the hypodermic syringe a few mimims of chloroform—ten may suffice—into a vein of a full-sized rabbit. Within a second or two there is death from instant and perfect arrest of the action of the heart. If we now lay open the thorax we find the heart on both sides firmly contracted on firmly clotted blood which fills all the cavities, while the lungs are intensely congested also with clotted blood. If, further, we try the irritability of the muscles with the galvanic current, we find the heart absolutely dead, while all the other muscles of the body respond vigorously to the stimulus, and continue so to respond, it may be, for an hour. In this case the heart receives immediately the fatal dose, and the death is due to the contraction excited by the stimulant. We understand here every step of the process. We follow the chloroform into the right side, over with the pulmonary stream into the left auricle and ventricle, and from the left ventricle into the coronary system of the heart itself, there to excite the cardiac muscular spasm which leads to the irremediable death. Still by this experiment we prove only that the heart is fatally influenced when a large quantity of chloroform is thrown into it through the blood, and we have it still an open question whether the same arrest of the cardiac action will take place when the vapour of chloroform is carried to the heart through the lungs, by inhalation. Twenty years ago it was assumed that in nearly every fatal case death was owing to cessation of the heart, and we are indebted to Dr. Sibson for a very acute and admirable suggestion explaining the cause of the suddenness of the death. The heart, said he in effect, for I forget his exact words, first feeds itself with blood by its coronary system of vessels.

It receives, therefore, into itself the first impression of every stroke of itself. If the blood with which it is fed is normal, it is first fed by it; if the blood is abnormal, it is first injured by it; and so when the blood of the left side is charged with chloroform the heart is the organ primarily influenced by the agent. In inspiring vapour of chloroform what then do we do? We bring the vapour over an immense surface exposed to blood; there it is condensed, there it commingles with the arterialised blood as condensed, and from thence it travels direct through the left cavities into the structure of the heart. The process is much the same as that of direct introduction through a vein, but yet I cannot in any case, in a healthy animal, bring the heart to a standstill in the same way through the lungs. I always find that as the quantity of vapour is increased the introduction of it into the blood is impeded by the direct action exerted upon the pulmonary vessels. In plain matter of fact, I doubt whether it be possible to kill the perfectly healthy heart by the direct action of a poisonous amount of chloroform introduced into its substance through the respiratory surface. But I will not say the same of a heart that is not healthy, nor of a heart in which the nervous mechanism is injured, the muscular substance appearing healthy. Such a heart might possibly succumb under a dose of chloroform small enough to pass through the pulmonary vessels without exciting contraction in them, and small enough not to produce anæsthesia.

A third series of facts, learned from direct experience in narcotising inferior animals, relates to the inquiry whether, if the idea of narcotising at once, and as we may say, by violence, be given up, it is best to begin with gentleness and to continue slowly, or to begin gently, and, having subdued the preliminary excitement, to push on the inhalation more rapidly. Some administrators give the vapour so cautiously that they rarely have the patient ready for the knife under six or seven minutes. Others carry on the administration quickly through the second and bring the patient into the third degree in from four to five minutes. Snow's rule was two minutes for infants, three for children, and four or five for adults. The rule is a sound one, as is another rule from the same author, that when the second stage of excitement is vehement, it is best subdued by carrying on the inhalation firmly and resolutely. In animals, I find that when the first stage is over, it is always safer practice to narcotise quickly to the third stage than to go on slowly saturating the body with the vapour, and rendering any accident which might be casual fatal. For the fact cannot be too strongly impressed on slow and overcautious administrators that when an animal body is being charged for a long time with chloroform the whole of the substance introduced is not utilized in producing anæsthesia. Some of it is eliminated into the alimentary canal, some is stored up in the liver, some in the cellular tissue, some in the muscular fibre, in all of which parts, as you know, we can detect it chemically. Excess, therefore, is so much dangerous excess; if any organ fail while the excess is present the action of withdrawing the chloroform from the breathing is of no avail, for there is a steady reabsorption into the circulation, from the body, and the narcotic effect is sustained. Some perfect illustrations of the influence of moderately short as compared with long administration have occurred in my experiments for the resuscitation of animals that have ceased to breathe under chloroform vapour, and I can determine, by method of administration, whether an animal shall be recoverable or not after respiration has ceased. If the animal shall have ceased to breathe within four minutes I can insure, in five cases out of six, to resuscitate at a temperature between 50° and 60°. But if an animal remain even in less vapour, for seven minutes before respiration ceases, I cannot insure recovery in more cases than one in six.

The lesson taught by this series of facts is then not to induce slow narcosis; but having carefully felt the way in the first minute or two of administration, in the adult, to push quickly into the third degree in which, if the body be not surcharged with chloroform, the danger is comparatively small.

Attempts have been made to modify the effects of chloroform, and to render it safer for administration by mixing it with other fluids. Chloric ether (a mixture of chloroform in alcohol) was used, at the suggestion of the late Jacob Bell, before chloroform was introduced at all as an anæsthetic; and so soon as chloroform came into common use, it was tried in various forms of admixture. Ether and chloroform; alcohol and chloroform; alcohol, ether, and chloroform have been combined and applied with varying success. The Vienna mixture, which was composed of one part chloroform and six of absolute ether, has been the most extensively used of all these compounds, and I believe it to be the best. At the request of Mr. Well's, I once administered the Vienna mixture, while he removed the upper jaw from an adult person; and once again while he performed the operation of ovariotomy. I have also used it many times for minor operations, and compared it with other mixtures over which it seemed to me to have advantages. But after all, I could see no possible advantage in this or other mixtures over the simple agent. Snow was early to point out that, when we employ a mixture of ether and chloroform, we produce narcotism with the lighter ether and keep it up with the chlorofrom, so that there is a mixed effect, and this is essentially true of all mixtures that have been constructed. Let me put on the board the physical properites of the three agents chloroform, etyhlic ether, and ethylic alcohol, and you will see how different they are and how improbable, I had almost said impossible it is that they should act together; that is to say, that they should at the same temperature evaporate uniformly and equally, diffuse uniformly and equally in the air, and condense uniformly and equally in the blood.

	Specific gravity. Water = 1000.	Vapour density. Air = 1.	Boiling point.
Chloroform - -	1·491	4·141	142° Fahr.
Ethylic ether -	0·720	2·586	95° Fahr.
Ethylic alcohol	0·793	1·613	173° Fahr.

We cannot look for a moment at these simple facts without seeing how puerile it is to expect uniformity of result from the evaporation and diffusion at the same temperature of bodies so physicially different and only mechanically admixed. In evaporation the three agents split up into their three distinct vapours, each expanding its own natural way, diffusing its own way, condensing its own way, and, what is more, each playing its own natural part in physiological action. To sum up, when we mix chloroform with another agent, we weaken it as if we diluted it in air to reduce its effects, so that the question of mixtures brings us back to the previous question of quick or slow narcotism, which has already been discussed.

If it were possible to get two fluids which were near to each other in physical characters, we should in a mixture of them obtain a compound on which to base a scientific research on the effects of admixture. We might take bichloride of methylene and ethylic ether for this purpose, as will be seen when the two agents are compared.

	Specific gravity. Water =1000.	Vapour density. Air = 1.	Boiling point.
Bichloride of methylene	1·344	2·937	104° Fahr.
Ethylic ether - - - -	5·720	2·586	96° Fahr.

And I could offer other combinations which are nearer than these in relation to physical constitution. Now such analogous bodies, I admit, deserve to be studied in action alone and in combination, for one of them might be discovered to produce physiological effects corrective of dangerous faults in the other, and a grand result might be obtained. But the empirical methods of mixing fluids of different qualities for the assumed purpose of obtaining uniformity and safety of action partakes of the philosophy of the hospital patient, who partook in one dose of a small quantity of each fellow patient's medicine. As a serious proposition it indicates a scientific coupling, in which love for something new dallies hopelessly with idleness for research.

In conclusion, reviewing the past of chloroform as an anæsthetic from its introduction until now, I see nothing to lead me to assume that any of the deaths which have followed the administration have been due either to absence of skill on the part of administrators, want of special knowledge respecting special apparatus, or absence of special mixtures of chloroform with other fluids. I see nothing, again, in bad quality of specimens of chloroform to account for the fatality which has followed its use. Lastly, I see nothing in operative surgery (except that there *seem* to have been more deaths from the vapour when it has been used for minor than for major operations), to account for the fatality. All through the chapter one administrator appears to have been as skilful and as thoughtful as another, one quality of chloroform as good as another, one operator as careful as another. I can find no single death from chloroform in which even a pretext of a charge could be raised against these factors in the catastrophe. We must therefore look for the cause of death in some inherent fault in the chloroform itself, which unfits it for every person indiscriminately; or, putting it the other way, in some inherent fault in the organisms of certain who die, which renders them unfitted to meet the physiological changes the chloroform excites when it is introduced into the organism.

[In another paper Dr. Richardson considers—1. The modes of death of this agent. 2. The cause of death. 3. The means to be employed in attempting resuscitation when life seems to have ceased under the influence of vapour of chloroform.]

Modes of Death.—There are four modes of death from chloroform. The first may be called *syncopal apnœa*. The death by this mode is very rapid, occurring within the minute after the commencement of inhalation. The action of the vapour in this mode of death is, as I have explained in a former lecture, by the immediate influence exerted by it on the peripheral nervous system. By this action respiration is for an interval suspended, there is accumulation of carbonic acid in the blood, irritation of the vagus, and arrest—from the irritation—of the action of the heart.

We can illustrate this mode of death with certainty in the inferior animal. We take a glass chamber and charge it freely with vapour of chlorofrom at a temperature of 75°; at least 15 per cent. of the vapour should be present. Into the chamber we introduce any small warm-blooded animal, and in the matter of three or four seconds it ceases to breathe. There are present the signs of commencing apnœa—lividity, coldness, insensibilility. These signs just appear and then the heart stops, and if nothing be done to restore life, death is complete. When we open the body after this form of death, we find the heart containing blood on both sides, but paralysed for the moment completely; we find the lungs containing blood in the pulmonary circuit and yet not congested with blood; we find when we test the muscles with the electric current that they contract readily and that they preserve their power of contraction for a long time, half an hour at least, under stimulus, if they be not exhausted by the stimulus itself; lastly, and let this fact never be forgotten, the heart, although paralysed within the body, is not irrevocably dead; we expose it to air by opening the pericardium, and as the blood in the right auricle absorbs oxygen and brightens in colour, the auricle recommences to contract, the ventricle follows rythmically, and in time all the motion of the organ is restored.

The human subject sinks, as we know, from this mode of death under chloroform, and we can understand now the kind of subject that is most likely to succumb in the manner described. It will be the young or feeble subject, or the irritable, nervous, shrinking subject: such a one as would be likely to faint under a sudden shock or alarm; or it will be the vehement resisting subject—one who, excited by the first impression of the vapour, would grow violent under coercion or restraint while made to inhale the vapour. A remark by Dr. Sansom occurs to me here. He observes that persons who are in health and are about to be subjected to some

minor operation are put under chloroform with more difficulty than are those who, by long illness and suffering, are resigned to their fate, and who, prepared to meet the worst, have to some extent, lost the sense of fear. Few better observations of a practical kind were ever made than this, and it applies with singular force to the mode of death now under consideration.

I cannot, while treating of this rapid mode of death, avoid saying a word against the promotion of it by an error in administration of chloroform which may be called a moral error—an error most reprehensible, cruel, insane, and yet not uncommon. This is the error: to bring a patient just prior to the performance of an operation, when the anxiety which weakens the strongest man or woman is filling the mind—to bring the patient thus circumstanced, with all the senses open, into the presence of an assembly of practitioners and students, and commence without any preparation or soothing, quieting expression, the administration of the narcotic vapour. It is not a wonder that some sick persons die under this ordeal; the wonder is that so many survive it. To bring a living intelligent human being to the borderland of life by any narcotic is not a fool's errand for mankind, but a solemn service, and I think in all cases of death from narcotic gases and vapours this point relative to administration is one on which a coroner might make due inquiry, with advantage to the profession not less than to the community.

The second mode of death may be called death from muscular excitability—*epileptiform syncope*. It occurs during the second stage of narcotism—the rigid stage, as it has been designated. In this stage the chloroform is acting as an excitant to the whole muscular system through the blood, which conveys it over the organism, and in this excitement the involuntary as well as the voluntary muscular fibres share. Efforts to vomit not unfrequently precede death when it occurs during this period of administration, and the death if it happen is instant, and by pure and simple syncope. If we could suddenly empty the whole arterial system of blood, a more perfect syncope could scarcely be induced, and in fact the emptying of the arterial system is what really takes place; for if we open the body of an inferior animal immediately after the death, we find the left side of the heart with the arteries empty, and the lungs themselves entirely blanched and bloodless; bloodless as if they had been washed with water by injection. I have shown this condition, as you will remember, many times. When again we turn to the structure of the brain, we find it in the same blanched and bloodless state. All through the body, in short, there is evidence afforded, on the arterial side of the circulation, of intense arterial contraction. The venous side tells in another way the same story; for the right side of the neart is engorged with blood, the veins are engorged, the sinuses are engorged, the arteries have poured their contents into the veins, and contracting firmly in their minute ramifications have shut up the blood in the veins, and produced complete arrest of motion throughout the circulation. Considering how commonly and how severely the second stage or degree of narcotism under chloroform is developed, it is a matter of wonder that death is not more frequent during this stage. Happily, if the vapour is administered steadily and freely, the stage of excitement is comparatively short, and, happily also, when the next or third degree of narcotism is reached, the danger of continued muscular rigidity is past. When death occurs in the second degree of narcotism from chloroform, the rigidity of muscle alternates with relaxation, the result being a convulsive effort resembling true epilepsy. The first death from chloroform, in the case of Hannah Greener, was of this nature.

Why in exceptional cases death should occur during the stage of muscular excitement, while so many persons pass through the ordeal of that stage unscathed, I cannot readily answer. The cause of death is excessive irritation of the sympathetic nervous system, and it is fair to assume that any previously deranged condition of that system would be

a reason for the danger. Any pre-existing irritation of the stomach or of the inestinal surface would be a predisposing cause of danger, as would prolonged emotional excitement and hysteria. The fatal accident might happen, when the excitement is extreme, from indecision on the part of the administrator as to whether he should stop the administration altogether, or push it on to the production of the third degree. In the inferior animals, death during the stage of excitement is readily induced by more prolongation of the second stage, and what is true in respect to the lower animals is, I think, equally true in respect to man.

The third mode of death from chloroform is one in which from the slow and continued action of the nacrotic, there is *paralysis of the heart*, with apparent paralysis of the muscular system generally. If we take a perfectly healthy animal, narcotise it carefully, and bring it into what was called by Snow the fourth stage, or the stage of complete muscular relaxation, we shall have led the animal up to the border of death; if we then carry our narcotism a little further, the heart and the respiration will cease together, but before the heart shall cease it will give us intimation it is about to stop by one important sign, it will give an *intermittent* stroke. See, here are two animals in the profound and all but fatal fourth degree of narcotic sleep. One animal is a pigeon, the other a rabbit. We remove the bird from the vapour, and observe how complete is the muscular relaxation; we listen to its heart and hear how distinctly that organ is proclaiming, by its intermittent pulsation, the imminent approach to the cessation of its labours. It is like a stopping watch, which gives a few ticks, then waits, then goes on again. But now that the vapour is no longer being inhaled, and that the oxidation is unimpeded, the recovery of the animal is certain. We will let the other animal remain in the vapour and soon it ceases, but almost inperceptibly ceases, to breathe and to circulate blood. We say it is dead, and so it is, but this I would point out, it is not equally dead throughout its body. Its voluntary muscles respond to galvanism, the respiratory muscles respond, but when we expose the heart and subject it to the galvanic stimulus it is absolutely dead.

This mode of death from chloroform would very often happen if in every operation it were necessary to carry the insensibility to the fourth degree. Fortunately this is not the case, for under chloroform the consciousness fails before the failure of the muscular power, and when there is unconsciousness we can in most cases proceed to operation at once; thus we rarely run the risk of the extreme degree of narcotism, or if we reach it we withdraw the vapour; and, the subject before us being healthy, we secure the recovery, in the same way as we have secured it in the bird which has been narcotised to-day.

The fourth mode of death is a compound death; there are in it two factors, *depression from chloroform, and surgical shock*. The combination may be in two or three ways. In a few instances of death hemorrhage has brought to a fatal degree a depression which had commenced during and from the administration of chloroform, The death here is by syncope, and is often sudden. In other cases the patient has not been fully narcotised, and in a half unconscious state feeling the pain of the operation has become faint and died from syncope. In this case again the death is sudden. Dr. Marshall, of Mortlake, has particularly directed my attention to this mode of death, and has dwelt, I think, with force and truth on the errors sometimes committed, first in supposing, in the case of small operations, that it is only necessary to administer a little narcotic vapour, and, secondly, in proceeding to operate while the patient is excited and not insensible. There have been several deaths at this juncture of the first step of an operation during the first degree of narcotism. Finally, under very deep narcotism, carried near to or into the fourth degree of insensibility, death may take place from severity of shock, incident to operative procedure. I have noticed always in administering an anæsthetic to deep anæsthesia during the performance of the operation of ovariotomy that when the

operator first puts his hand into the peritoneum, or when he uses the sponge to clear out the abdominal cavity, there is an alteration in the beat of the heart, a quickness of beat with feebleness, and even with intermittency. I remember also a case where in order to break up firm adhesions in the knee-joint, I administered chloroform to a lady to the degree of complete muscular prostration, while Mr. William Adams made sharp and forcible bending of the joint. With each act of the operator in this case, the pulse stopped for the moment as if it had been mechanically arrested, and then after a pause recommenced its beat. It was necessary on three separate occasions to perform the operation thus named, and on each occasion the phenomenon described was equally well marked.

The case of death under chloroform, which recently occurred in Scotland, when Sir James Simpson administered the vapour, was, I conceive, an instance in which the fatal termination was due to the combination of narcotism and surgical shock.

Cause of Death.—When we have clearly before us the modes of death from chloroform, we are led the more readily to see the immediate cause of death, and in this survey we strengthen our view if we combine with mode of death the phenomena which naturally accompany ordinary narcotism under chloroform.

In the first stage of administration, the effect of the vapour is upon the peripheral nervous surface and the cerebral centres. In both there is excitation, and very early the cerebral centres lose there natural condition, becoming suspended in function. Following immediately upon this, the cord, the sympathetic system, and the true nervous system of the heart, become excited. Thirdly, the nervous excitation generally ceases, and there follows calmness, or even depression of action, and if the administration be continued the medulla fails, the sympathetic fails, the cardiac nervous centres fail. This, then, is the natural order of death of each part—Brain, cord, sympathetic centres, cardiac centres.

It does not appear that the act of producing cerebral unconsciousness is ever a cause of danger to life, and, except in cases where the vapour is too irritating, we have little evidence to show that during the administration of chloroform there is any primary risk from injury done to the centres of the nervous system that govern respiration. The danger really commences when the vagus, or the organic nervous centres, or both, become implicated, for then the contractile elements of the vascular system are at once modified in function. Wonderful light has been thrown on cardiac action during the last few years, and no subject does that light more illuminate than this we have now specially in hand. In his excellent paper, to which I referred at the last lecture, Dr. Rutherford sustains the modern theory, "that the contractile elements of the entire vascular system are presided over by two kinds of nerves, one motor, the other inhibitory," the motor bringing about "contraction," the inhibitory throwing "the motor nerves and contractile elements into a state of rest." The term "inhibitory" is, I fear, unfortunate as conveying the idea of an active process, which is not such, but is a mere passiveness. I will not at this moment, however, quarrel with a term, since it is more important to treat of the theory in relation to the action of chloroform, and the theory tells us simply that if the vagus be subjected to irritation the motion of the heart is arrested quickly, but that after a time it may recommence to beat even when the excitation is continued; that paralysis or division of the vagus increases for a time the speed of the heart; that the two cardiac nervous centres with branches from the sympathetic are the real motor nerves of the heart, and that between the two sets of nerves, the inferior cardiac branches of the vagi and the motor centres, there is a balance of action.

In all the modes of death from chloroform we see a fatal disturbance of this balance. In the first mode—by syncopal apnœa—we see the direct action (inhibitory it is called) of the pneumogastric upon the heart; in the second mode—by epileptiform syncope—we see the direct effect of

excitation of the centres which supply the motor or contractile elements of the vascular system; in the third mode—by failure of muscular motion—we see the effect of the poisonous agent upon the motor system carried to paralysis; and in the fourth, when surgical shock combines with depression from chloroform, we see direct paralysing action both on the sympathetic and pneumogastric.

After death by chloroform it is the common practice to report on the condition of the heart of the patient. Thus sometimes the heart is said to have undergone fatty degeneration, at other times to be thin, and again to be quite healthy, so that from the many and different reports in different fatal cases respecting the condition of the heart no rule can be deduced which the morbid anatomist can accept as explanatory of death, or on which, in other cases, the diagnostician can rely as indicating danger of death. In this there is nothing remarkable. Let us bear in our minds the truth that chloroform, when it kills, kills not necessarily by its action on the muscular structure of the heart, but by its influence on the nervous mechanism of the heart, and then the actual condition of the muscular structure becomes secondary in estimation.

In conclusion, I infer that in every case of death from chloroform the cause of death is excitation either of the motor or of the controlling nervous mechanism of the heart. I conceive that any primary organic changes of structure leading to death are situated in that mechanism, and must be looked for there; and I think there is fair ground to assume that in some cases there may be death where there is no actual disease of structure, but simply so extreme a natural delicacy of balance between the nervous functions that the excitation produced by the chloroform is sufficient to arrest motion and to destroy life.

On Resuscitation when Life seems to have ceased under Chloroform.—When, unhappily, death takes place in the human subject from the inhalation of chloroform, there is usually a rush of attempts to call back the lost life. One observer would flip the motionless body with a towel, or briskly rub the limbs; another would try galvanism; a third would commence artificial respiration; a fourth would combine every method. In a few cases there have been recoveries from seeming death during the application of some particular plan; thereupon, that plan has been vaunted as *the* plan, it has been tried again, and has not succeeded, and then it is urged that in the case where it seemed to succeed, it was merely coincident with natural recovery.

On the whole, nothing whatever has been learned from the human subject as to the best procedure after apparent death from chloroform, nor is it likely that anything can be learnt in this manner. In the first place, fortunately, no individual man can attain a sufficient experience from the human subject for systematic guidance; secondly a research made for the mere sake of research on the human subject accidentally destroyed by chloroform would be unjustifiable; and thirdly, the excitement and anxiety of attendants on those who die is so intense, that no rigorous observation or criticism of treatment can be carried out. We have, therefore, to learn all that is to be learned from the inferior animal, and in this way we can learn with hope for the future, and with soundness of observation at the time; we can repeat observation on observation; we can prove what is injurious in treatment; we can note down what is useful, we can confirm what is real. In this research, moreover, while the object we have in view is one of the greatest and most humane that can occupy the human intellect; it can be carried out without inflicting on the inferior animal world any trace of suffering. The animals simply sleep as we do when we inhale the narcotic vapour.

This, therefore, has been the inquiry pursued here in respect to methods of recovering from death by chloroform, and I may say at once that much has been learned that can be demonstrated as usual.

There are two methods deserving consideration in respect to resuscitation—one may be called the natural, the other the antidotal method. By

ie first we aim to sustain the organic functions so effectively that the oisonous vapour may be lifted out of the system, and the organic functions be therewith restored. By the second we aim to neutralise the poison, or to counteract its effect, by the employment of some opposing agent or principle.

In pursuit of the natural method I have studied many plans—artificial respiration, electrical excitation; artificial circulation, transfusion. For full particulars of these researches I must refer you to my papers in the Proceedings of the Royal Society and in the Medico-Chirurgical Review, for July, 1862. For the present moment I confine myself to two of these methods alone—artificial respiration and electrical excitation. These are the two methods best known and most commonly used; and if I define clearly their values I shall not only leave some practical facts on the mind, but shall lead up to future advances towards more accurate knowledge and experience.

On the human subject artifical respiration is followed out simply in order to imitate natural respiration; while galvanism is followed, in a less definite manner, by some to excite respiration, by others to excite the heart, occasionally for neither of these reasons, or for both. In my researches I and no ill results were at any time observed. We have seen a very similar have usedartificial resp iration for the same simple purpose as it is used on the human subject, striving only to make it perfect; while I have used galvanism for three distinct purposes: First, to excite and sustain respiration; second, to excite and sustain the heart and respiration; third, to excite the heart while the respiratory process was sustained by artificial respiration.

You will ask, immediately:—Can anything be done? I answer immediately:—Yes. I answer that in some cases where death from chloroform appears to be perfect—where if nothing were done, the animal would be dead—life can be restored; can be restored with certainty in a given number of cases out of a given number of deaths—in one case out of three, I may venture to say without fear of saying more than is true. We find at the same time that the result is not the same after each mode of death. It is most easy after the first mode, less easy after the second, and rarely possible after the third. I have not tried it after the fourth, but I should infer that it would be nearly the same as after the first mode. What is more—and the fact is as singular as it is obvious—the restoration of life is much more easy during cold and cool than it is during hot weather. When the temperature of the day is between 70° and 80° Fahr. the experiment usually fails. Lastly, the experiment usually fails if the chloroform be administered for several minutes before the narcotism passes into death.

The plan for restoration which, up to this time, succeeds, and the only one which suceeeds, is that of careful, delicate, but at the same time steady artificial respiration by the double acting bellows, which I have already described.* So soon as respiration and the other evidences of life have ceased, we insert the exit tube of the bellows into the nostril and empty the lung by a stroke of the bellows on the emptying side; then we gently inflate, and next empty and fill in alternate stroke. Let us proceed to demonstration. We put a large well nourished rabbit gently to sleep with vapour of chloroform, we carry on the administration quickly, and, as you see, at the end of four minutes the animal has ceased to breathe. We may let it lie in this way a full minute, but we must not move it or handle it. The least pressure with the hand on its thorax or abdomen, or the lifting it up quickly, would be fatal to success. Now we introduce the nostril tubes of the bellows and first exhaust the chest, then fill, and in the end exhaust and fill steadily some twenty to twenty-five times a

* The double acting bellows were described in the lecture on artificial respiration, published in the last volume of the *Medical Times and Gazette*. The bellows are made by Messrs. Krohne and Seseman, of 8, Duke-street, Manchester-square, whom I have much pleasure in thanking for the intelligent pains they have taken in carrying out my design. The bellows are inexpensive and are useful for other purposes than artificial respiration. *Retrospect*, vol. lxi., p. 90.]

minute. We must wait patiently for three or four minutes, keeping up the respiration before we can expect a result; and while we wait let me narrate this peculiarly interesting circumstance, that in proportion to the time allowed to elapse between the death and the restorative process, so must time be allowed for continuing the artificial respiration. If the animal die at once and the artificial respiration be commenced at once, one or two strokes of the bellows are often sufficient to restore independent life; but when, as in the present case, the time is long before respiration is artificially set up, then some moments must be allowed for recovery. Why is this? It is because the respiratory muscles and their nervous centres must be recharged with blood before they can take on their action again, a slow process when the motion of the heart is all but extinguished.

We persevere, and now observe we are about to be rewarded with success; if you watch closely you will perceive a tremulous muscular movement in the flank of the animal; it is followed by an inspiratory effect. The muscles are now recharged with blood, and the organic nervous centres are recharged, and this effected, I know, by experience, I have done enough. I remove the little tube from the nostril and let the recovery be completed by natural respiration. The animal will in time awake as if nothing had happened to it.* Was the animal in this case dead? It was practically, is was not actually. The brain was dead, the cord was dead, the voluntary muscles were under no stimulus; the semi-voluntary muscles were under no stimulus; but there was one organ, which though we could not discern its motion was in feeble action; and that organ was the heart. By our gentle manipulation we restored the heart; it recharged itself, it slowly recharged the other muscles and the nervous centres with blood, and at last there was natural action. The experiment is so easy to perform, so uncomplicated, it would appear as if it ought always to succeed; and it would always succeed if we knew a little more. But at present we only know certain causes of failure, of which there are several. Sometimes we fail because the system is too fully charged with chloroform; sometimes because the column of blood from the right to the left side of the heart is broken; sometimes because the pulmonary vessels are contracted; sometimes because there is coalescence of the blood corpuscles from stasis and plugging of the minute ramifications of the pulmonary artery; sometimes because the blood coagulates, and this especially if the temperature of the air is high; sometimes because, again under high temperature, the muscles soon become rigid; and sometimes, it may be, because the nervous centres suffer molecular change so that they fail to recharge and resume function. These seem many difficulties, but really they are closely allied, and one day we shall see a mode of overcoming them altogether. Then the results will be much more striking than they even now are.

So much for artificial respiration; next, as to electrical action. I have employed electricity, as before said, with three objects in view, and I have used it in various ways: as frictional electricity, as continuous current, as an intermittent current. On the whole, I find the best apparatus to be this convenient little persistent battery made by Schmidt and Robinson, of the Strand. If anything could be effected by the excitation of muscles from electrical action, we have in the instrument before us all we could reasonably desire.

Let us again proceed to fact. We have narcotised another rabbit rapidly until it is practically dead. We could restore the animal if we pursued the same method as in the last experiment: we will use the battery instead. We will use it first with the object of restarting muscular motion in the respiratory muscles. For this object some, in the human subject, put a needle from one pole into the tract of the phrenic nerve, and then apply the opposite pole to or over the diaphragm. Others put the needle

* The animal made a perfect recovery in this case. It lay without evidence of life for the full period of six minutes and a half, the longest period I have as yet known to be followed by recovery.

under or subcutaneously upon the larynx—in plain, the position is c
little moment if the second pole be in contact directly or indirectly wit
the diaphragm. I will bring one pole by a needle in contact with the laryn
and the other in contact with the diaphragm. And now when I make an
break contact you see the respiratory act is perfect; the air enters the lun
readily, and I bring back inspiration and expiration as faithfully as if
were filling and emptying them with the bellows. I continue this actio
but note what soon occurs: the muscles begin to respond more feebly, a
quickly cease to respond; I gently increase the current, and by this renew
action is seen again; at last the organs cease to act under any current; b
if I change the current and pass it through the limbs of the animal t
muscles of the limbs respond readily enough. Why not then the muscl
of respiration? Because we have exhausted them by the electrical actio
when I was sustaining respiration by the bellows my hand supplied for t
time the respiratory power of the animal. I gave the force, and t
muscles of the animal rested and recruited. When I used the electri
stimulus I took out of the muscles what remaining force was there—t
powers were required for recovery—and under a semblance of restori
life it destroyed death.

[illegible] go one step further, this animal could not be restored now
any known method. We will then open the thorax and look at the hea
At first sight the organ is seen at perfect rest, but in contact with the
[illegible] and it a little at the auricle and ventri
[illegible] [illegible] [illegible]. We will repeat the electrical e
[illegible] [illegible] through the heart at the lowest power. Obser
[illegible] [illegible] [illegible] [illegible] [illegible] [illegible]

ficial respiration. But artificial respiration must be done properly to be effective; it must be done with the body at perfect rest; it must be done as we have done it here in our experiments by a double-acting bellows or pump which shall exhaust and fill the chest with air. It must be carried out steadily and gently; it must be withdrawn when there is any natural effort at respiration; it must be continued until a puncture of a vein shows that there is coagulation of the blood. Above all, it must be absolutely trusted until some new and definite advance is made, the soundness of which is demonstratable by direct experiment. If to every hospital operating table and to every private operating chair a double-acting pump or a bellows were permanently attached and always ready for use, and if in emergency it were at once brought into action methodically and with fixed purpose, under the surety that if it failed all means will fail; if the body be kept meanwhile in entire repose, so that no violence nor shock be allowed to check the little remaining power of the heart, then I believe, from experimental data, that at least one in every three or four of the cases now ending fatally under chloroform would be saved.

And still there would remain work enough to be done: work to improve further the process of resuscitation as a general process; work to find an agent for anæsthesia which shall destroy sensibility, but shall not possibly endanger life.—*Medical Times and Gazette, May* 28, *and July* 23, 1870. *pp.* 574, 86.

109.—CHLOROFORM ADMINISTRATION.

By Dr. A. Ernest Sansom.

[The following short article is a critique upon some remarks in Dr. Richardson's paper on chloroform.]

All attempts to insure greater safety by the use of chloroform diluted with volatile media are at once condemned by Dr. Richardson as puerile and empirical. A table is given showing the great differences in specific gravity, vapour density, and boiling-point of the agents which are commingled, and from these figures it is supposed that the question is to be judged. I hold on the other hand that a dilution of chloroform with an equal bulk of absolute alcohol effectually insures the administration of an atmosphere containing as nearly as possible one-half the percentage which results when undiluted chloroform is employed. This is not at all a question of vapour densities and boiling-points. It is not pretended that the evolved chloroform-vapour is diluted *pari passu* with the vaporised alcohol. As I have before stated the alcohol acts chiefly in restraining the volatility of the chloroform, and thus indirectly inducing a free dilution by favouring the admixture with air. This is no vague generalisation, but a deduction from experimental facts; and the success of the practice of thus inducing anæsthesia is attested by competent observers.

Dr. Richardson agrees with me in his estimate of the dangers of strong atmospheres of chloroform, especially at an early stage of the administration. His explanation of the exact source of the danger, however, requires reconsideration. Adducing Prof. Rutherford's observations on the effects of other irritant vapours as analogical evidence, Dr. Richardson concludes that when chloroform induces cardiac syncope it acts by stimulation of the inferior branch of the vagus by the asphyxiated condition of the blood. This is no new theory; it was enunciated by Brown-Séquard; it is upheld by Dogiel (Reichert's und Dubois' Arch. 1866). But the researches of "Scheinesson (Untersuchungen über den Einfluss des Chloroforms auf die Warmeverhältnisse des thierischen Organismus und den Blutkreislauf;" Arch. des Heilkunde 1869, Hft. 1, 2, 3,) prove that this view is untenable. It is shown that chloroform has equally the power of slowing the heart's action in animals whose vagi have been previously divided. Even when the spinal cord was divided in the cervical region as well as the vagi and

sympathetic, the heart's action was enfeebled by chloroform. The irresistible conclusion, therefore, is that chloroform has a special power upon the musculo-motor system of the heart.

The danger of chloroform resides in the fact that in strong doses it is a direct cardiac depressant. Its vapour when freely diluted, emotional causes of danger set aside, induces anæsthesia with very little risk. By previously diluting the chloroform with alcohol we can so restrain its volatility as to insure against the administered atmosphere being too strong at any given moment. The measure is simple, safe, and practical. —*Medical Times and Gazette, July* 23, 1870, *p.* 107.

110.—ON THE THERAPEUTICAL USES OF CHLORAL.

By the Editor of the Medical Times and Gazette.

The physicians of the Royal Infirmary, Edinburgh, have had an ample field for observing the action of the drug in fever, and found it valuable in assisting and promoting recovery by palliating distressing symptoms, though it has no direct influence in cutting short the disease, or in any way affecting its natural course. "In doses of thirty grains, repeated every hour—two or three times if necessary—in most cases a quiet and refreshing sleep is produced, which serves greatly to maintain the strength of the patient." Appetite is sometimes apparently improved, and excitement and delirium are frequently diminished. Violent head symptoms may require increased doses, forty to sixty grains. And it appears "from a limited series of observations," that in fever chloral produces little or no effect on the temperature, as determined by the thermometer (Brit. Med. Journal, April 30, 1870).

We have already alluded to its value in *delirium tremens*, and considerable evidence of this might easily be adduced. Dr. J. H. Barnes records (*Lancet* Nov. 27, 1869) ten cases of this disease treated by chloral, and in most of them quiet sleep was quickly induced. Dr. Cerenville found in a case of the disorder 15 grains repeated for two successive days procure sleep and calmness (L'Union Médicale, Feb. 12, 1870). In the Edinburgh Royal Infirmary it is found to be "almost a curative agent in this disease, as in most cases, notwithstanding violent excitement or delirium, it produces prolonged sleep, from which the patient frequently awakes sane and rational." And numerous communications to the medical journals, home and abroad, might be quoted to the same effect.

In *acute mania* its effects are of the highest value. Dr. G. Crawford has related (Med. Times and Gazette, Jan. 22, 1870) a case of acute mania in a female, who had not slept during five consecutive minutes for five weeks, and who had taken opium and morphia without benefit. He prescribed twenty-five grains of chloral for three nights in succession, and the effects were marvellous. Tranquil continued sleep was procured, and the patient rapidly recovered. In two maniacal females, whom baths and opium had failed to tranquilise, Dr. De la Harpe found that thirty grains of chloral almost immediately caused sleep (L'Union Médicale, Feb. 187[illegible] and Dr. J. B. Tuke, Dr. Clouston, Mr. R. Gardiner Hill, and others have found it as Dr. J. B. Tuke terms it, "the most valuable means of producing sleep which has yet been introduced into the pharmacopœia of the Asylum Physicians."

Dr. Clouston (Brit. Med. Journal, May 7, 1870), a most accurate and trustworthy observer, after having given it in forty cases of various forms of insanity, has thus summed up his experience of it:—"It has proved the most safe and certain sleep-producer; by it we can compel sleep in every case. By means of this property attacks of insanity may probably be warded off in some cases. Its action in abating and soothing excitement *is more uncertain* than its sleep-producing power, and lasts a shorter time

an that of any signally powerful drug, but is most valuable in certain
ses, especially in some recent and curable ones, where formerly we should
ve been afraid to give opium. Whether it does good or not, it never
es harm; and is in this respect the very king of narcotics. It generally
duces the temperature slightly, but in maniacal excitement not nearly
much as does alcohol in large doses. It should be given to subdue
ain excitement in doses beginning at twenty or thirty grains, repeated
from three to five hours. To produce sleep in great excitement, from
rty to sixty grains are required, the latter dose not failing in one
r cent. of the cases."

Dr. W. Macleod also has contributed (Practitioner, Aug. 1870) a
luable paper on the action of chloral in *Paralysis of the Insane.*—
e reports that when the patients are destructive and violent, the
dicious administration of the drug acts as an excellent hypnotic by
ght, and soothing agent by day; that under its action patients have been
e from destructive habits, and have gained in weight and strength; the
tion of the bowels and bladder have improved, and appetite has in-
eased; that it lessens abnormal sensations, often cuts short hallucin-
ions of hearing, and stops the propensity of patients to hurt or maim
emselves. He had also found that in melancholia convalescence is
vanced by its employment.

In *puerperal mania* the chloral has proved of great value. Thus Dr. S.
ller relates a case in which morphia internally and by hypodermic
jection was used without the least effect, and bromide of potassium
used excitement, but recovery took place under the use of the chloral.
d Mr. A. M. Adams reports (Lancet Jan. 22, 1870) a case in which he had
en bromide of potassium, Battley's sedative, and chloroform by inhala-
n without relief, but the chloral, in doses varying from 40 to sixty
ins, produced calm consciousness, followed by from six to eight hours
quiet sleep. In *puerperal convulsions* again it has given great relief, fol-
ed by recovery, after the failure of belladona and the bromide of potas-
m (Mr. Hay in the Practitioner, March, 1870), and Baron von Seydewitz
s reported to the Obstetrical Society of London (Med. Times and Gaz.,
ril 16, 1870) on the efficacy of "The Chloral Treatment of Eclampsia."

In *chorea* a large number of cases have been recorded showing the
medial influence of the drug. Sir J. Y. Simpson tells us (Med. Times
d Gazette, Jan. 1, 1870) that he has given it in continuous small doses
one, two, or more weeks in succession in chorea "and apparently with
st marked benefit." M. Bouchut has in severe cases found it bene-
ial, and M. Bricheteau has recorded (Bullet. Gén. de Thérap., Nov.
0) his conviction of its value in severe chorea in children. Dr. Russell
o relates (Med. Times and Gazette, Jan. 8, 1870) a case of very severe
orea in an apparently healthy woman during the early months of preg-
ncy, in which bromide of potassium was useless, but the administration
chloral was followed by the happiest results.

It has been given also in *tetanus*, and recovery has followed. As it causes,
en given in large doses, extreme muscular relaxation, it was natural to
e for benefit from its use in such a disease as tetanus, and M. Verneuil
orted to the Société de Chirurgie (Med. Times and Gazette, April 30,
0) a case of traumatic tetanus cured by chloral. The case was very
ked and severe, the spasms affecting the muscles of the face, jaws,
k, spine, abdomen, and lower limbs, and resisting the influence of
mide of potassium and the hypodermic injection of morphia in large
es. But immediate relief was obtained by hydrate of chloral in full
es. In the course of the case, and a month elapsed before complete
very, relapse occurred three times, and always when the chloral had
n temporarily suspended. The daily dose varied from ʒ jss. to ʒ iij.,
no ill results were at any time observed. We have seen a very similar
lately, under the care of Mr. Spencer Watson, in the Great Northern
pital, ending, under treatment by chloral, in about the same time in
ect recovery. *And M. Verneuil* has also related to the Société de Chir-

urgie a case treated by M. Dufour, of Lausanne, by the chloral. The daily dose of the drug had to be carried to twelve grammes, but the patient left the hospital cured at the end of a month (Gaz. Hebdom., July 8, 1870). It may be objected, and in M. Verneuil's cases has been said, that in these cases the patients recovered by lapse of time; but, at any rate, the chloral exerted an invaluable remedial influence by procuring relief from spasm, by giving sleep, and allowing the patients to take nourishment. And though our experience of the action of chloral in this disease is not yet sufficient to warrant full reliance on it, yet it is certainly enough to encourage further trials; and our hope in it is strengthened by Liebreich's discovery that the action of chloral and that of strychnia are so antagonistic that strychnia is an anitdote in the case of chloral poisoning (Med. Times and Gazette, vol. ii., 1869, p. 723).

M. Marjolin stated to the Imperial Society of Surgery that he has administered the chloral internally to relieve the *severe pain from burns*, and with complete relief to the patient (L'Union Médicale, May 19, 1870).

It would be easy, did our space permit it, to add considerably to this list of the conditions in which the hydrate of chloral has proved remedial or highly useful. It has been employed with the happiest effect for the relief of the cough in advanced phthisis of the lungs, and has proved a very valuable anodyne in some cases of gastralgia, pleurodynia, hysteralgia, dysmenorrhœa, &c., in the pain attendant on cancer, and acute local inflammations, and in lead colic and other forms of colic. In cases also of irritable bladder and chronic cystitis it has been found to give much longer and more perfect rest than large doses of opium.

In *phthisis pulmonalis*, the Physicians of the Edinburgh Infirmary have found chloral most valuable for producing sleep, for soothing irritation, and for relieving cough. Dr. J. Hughes Bennett observes (Practitioner, May, 1870) that such is the loss of appetite, increased weakness, and emaciation which follow the use of opiates and chlorodyne, that he never gives them except in the last stages of the disease, "and when all hope of prolonging life having ceased, we choose the least of evils in procuring even unhealthy sleep. But matters are greatly changed when we are able to obtain the natural sleep that chloral gives. By its aid we can lull irritation, and give rest for a time, in many cases without any injury whatever." He gives the results of its employment in twenty-one cases, and in the vast majority "the relief to the cough and restlessness at night, with the production of sound sleep, was most marked, while the head, tongue, and appetite were in no way affected."

We may note also that Mr. E. Lambert has lately (Edin. Med. and Surg. Journal, August, 1870) given us an instructive report of his experience of "the influence exerted by chloral on the pain of parturition." He gives fifteen grains every quarter of an hour "till some effect is produced, and according to the nature of that effect the further administration is to be regulated." He finds that it "does not only not suspend, but rather promotes uterine contraction;" that it is of great value; and that, while "it is the hypnotic for the first stage of labour," it may be administered under favourable circumstances "during and at the close of the second stage, with the result of producing absolute unconsciousness in the same sense in which we understand unconsciousness under chloroform."

Lastly, we observe that Mr. Lawson Tait has found the chloral a valuable adjunct to opium and chloroform. A smaller dose of morphia is required if a little chloral be also given, and when a patient is under the influence of chloral the inhalation of a few drops of chloroform suffices to produce profound anæsthesia (Med. Times and Gazette, vol. i., 1870, p. 195).

The very important question as to the reduction of temperature by chloral must be considered as yet unsettled. Dr. Richardson found that "during the narcotism produced by the substance there is invariably a reduction of temperature," and "that in birds and rabbits the temperature may fall five, six, and seven degrees Fahr., and yet the animal may recover." And cases are not wanting to support the idea that it may be

reat value—given in moderate and frequently repeated doses—for this urpose. But, on the other hand, some observers have failed to note any uch effect, and others have noticed a diminution of only one or one and half degrees Fahrenheit.

The drug should always be given in small doses at first—gr. xv. or gr. xx.—with the view of observing its effect in each individual case. The particular conditions that contra-indicate its use have not yet been accurately defined, but weakeness of the heart, and marked cerebral anæmia must be held, we think to impose at least special caution in its employment. It may be given with perfect safety and perfect success to children, in doses of two grains to an infant of eighteen months, of three grains at three years of age, and of ten grains at nine or fourteen. As evidence of this, Mr. A. N. Adams has successfully given five grains three times a day, or six grains at bed-time, in a severe case of pertussis in a child of six years of age.

It is worthy of special note that when the chloral is given as a hypnotic, care should be taken, so far as is possible, to help and promote the desired effect by administering the drug at or near the accustomed hour of sleep, and by securing perfect quietude and rest to the patient. It has not unfrequently been observed to produce no effect except perhaps some slight unsteadiness or giddiness if the patient has been moving about or there has been any noise or disturbance in his room, while the same dose will produce quiet and prolonged slumber when the individual has been in bed, and in circumstances favorable to hypnotism.

We do not pretend to have stated all the conditions in which the hydrate of chloral has been found useful; and no doubt it will prove of value against some disordered state in which, so far as we know, it has not yet been tried. Thus Liebreich has suggested that, as chloroform has been given with the idea of its dissolving biliary calculus, the choral is preferable for that purpose as furnishing chloroform in a nascent, and therefore more active, condition.

But it has been amply proved that, while the chloral will of course sometimes fail to produce the desired effect, it is in a very large number of cases unrivalled as a hypnotic and anodyne. It is, as a general rule, in appropriate dose, as sure a producer of sleep and soother of pain as opium itself or any of its preparations. It is more swift in action, more prolonged in effect, and produces a more calm and tranquil and innocent sleep. Sir J. Y. Simpson observed, "Ever and anon cases are well known to occur in practice in which patients declare their inability to take opium in any form without suffering severely from nausea, faintness, restlessness and other evil effects. In several such cases I have used chloral as a hypnotic with perfect success." And again, it has been found "to produce its hypnotic effects where opium, from long-continued use, had ceased to do so." But its highest value, its greatest superiority, lies in the fact that the sleep it induces is nearer in character to natural sleep, to the sleep

> "That knits up the ravelled sleeve of care;
> The birth of each day's life, sore labour's bath,"

than that excited by any other artificial means. Chloral sleep is much more natural than the sleep produced by opium, hitherto the most powerful and certain hypnotic. Dr. J. B. Russell (*Glasgow Med. Journal*) has well pointed out the differences:—"In both, as in natural sleep, the pupil is contracted to the utmost, but in chloral sleep it immediately dilates on awaking, just as in natural sleep. This is not the case in opium sleep. Again, chloral sleep is more natural in this respect—that the sleeper may be roused at any time, and at once recovers the full command of his functions; he may take food, pass urine, cough with full strength, expectorate, &c., and, as soon as the temporary excitation ceases, he may drop over again into unconsciousness. Not so with opium. The excretions are not disturbed by chloral. They are by opium."

The chloral sleep is, as already observed, gentle, calm, prolonged, refreshing, and followed by no unpleasant effects.—*Medical Times and Gazette Aug.* 20, 1870, *p.* 207.

111.—NOTES ON THE HYDRATE OF CHLORAL.

By Alex. Maxwell Adams, Esq., Surgeon, 2nd Royal Lanark Militia.

[It is open to question whether the theory upon which the action chloral is explained, beautiful though it is, is really true. It is n unlikely that it acts as a whole, and that its action is more likely to weakened by the decomposition in question than otherwise. Wheth true or not, however, it was the theory which led to the discovery of t fact.]

Although the mode of action of chloral may be involved in doubt there can be none as to its value as a remedial agent, and I therefore be in the following rough notes, to briefly state the result of my experienc which has been somewhat varied, and has extended over a period of fi months:—

As an Anodyne.—Chloral, as a general rule, will not alleviate seve and persistent pain where it fails to induce sleep, its anodyne and hy notic action being, in a great measure, dependent the one upon the othe Where the functions of the brain are intact, and the dose is a medicin one, the hypnotic action of chloral is rarely so profound as to destro all feeling or means of communication from without; therefore the pa oxysm of aggravated neuralgia, for instance, will often suspend the actio of the largest dose of chloral which it is safe to give. I have had two suc cases lately under my care. I have found both patients (females) suscep tible to the influence of 20 and 25 grain doses, *during the painless interva* but have entirely failed with 40–50, and on one occasion with 60 grain to produce any effect whatever, *so long as the paroxysm lasted.* Imme diately upon its cessation, however, such doses took instant effect, tw three, four and five hours after administration. Chloral, when it is n likely to be retained by the stomach, may be given as an enema wit success.

Case 1.—I was sent for the other night to visit an old patient labourin under excruciating pain in the stomach, attended with violent retchin and vomiting. For some years past I have had this woman occasional under my care, similarly affected, and have always found the attacks to b most obstinate and distressing. On this occasion I ordered one drach of chloral to be dissolved in a wineglassful of fluid starch, and given an enema. She slept within thirty minutes, and awoke six hours afte wards feeling well and free from pain. The pain did not return. Althou chloral has failed in my hands to afford much relief in severe outward pai more especially of a neuralgic character, yet I have found it highly ben ficial in many cases of internal pain, viz., of the stomach, bowels, bladde womb, &c. Case No. 1 is a fair sample, and I could give many. Chlor however, upon the whole, is inferior to opium for anodyne purposes.

Chloral as a Hypnotic and Sedative in Functional and Organic Diseases the Brain and Nervous System.—Opium is inadmissible in the treatment many such cases, hazardous in some, and uncertain in all, often leading results the very opposite of what was anticipated. The converse can said of chloral—it is contra-indicated in no case where a sedative a hypnotic are required, and is safe and certain in all, leading to no oth results saving those anxiously looked for. We have stood by the beds of many a sad case, have given opium—only to aggravate, however—a have been obliged in reality to leave our case to sink or swim very much the hands of nature, assisted by powerful nurses, strait-waistcoats, canv sheeting, &c. All this is changed since the discovery of chloral. matter how wild the delirium, how acute the mania, how frightful the c

vulsions, we can now with almost positive certainty predict that there will in a few minutes be calm repose. The following cases will serve to illustrate the above:—

Case 2.—Mrs.——, a fragile, delicate woman, was seized with *acute mania* four days after the birth of her first child. This was the most aggravated case of the kind it is possible to conceive, her struggles and cries defying all description. Gave two doses of bromide of potassium without benefit, then forty minims of Battley, which was repeated at the expiry of two hours, equally without result. I then put her under the influence of chloroform, thinking thereby to aid the opium in producing sleep, but still with no effect. I was now *hors de combat*, and could do little more than assist in the adjustment of sheets, for the purposes of restraint, as her head had been already shaved, ice applied, leeches, &c. This was on the 29th November, when chloral, as a therapeutic agent, was in its infancy. Having read an early notice by Liebreich regarding its efficacy, it now occurred to me to telegraph for a supply, which fortunately arrived in time to be of service, as my patient appeared to be *in extremis* when I administered the first dose—her extremities were cold, her pulse a mere vibration, and hardly perceptible at the wrist; but her cries and struggles continued unabated. I had, in fact, to extemporise a strait-waistcoat, as no manual force could keep her in bed. I administered 40 grains, and, as if by magic, in about five minutes she became quite calm and sensible, complained of great drowsiness, and within ten minutes fell into a profound sleep, which lasted for seven hours. Her pulse gradually gained in volume and diminished in frequency until it fell to 90 beats. She breathed rather quickly and heavily for the first two hours, but afterwards the sleep was natural and even light. Great drowsiness all next day; pulse improving; takes food, and is tolerably sensible. Towards night the mania returned with great fury; gave 40 grains of chloral as before, with exactly the same results—namely, an almost immediate return of calm consciousness, followed by a prolonged but natural sleep; I was obliged to continue the use of chloral at intervals, for about two months, in this case, and always with the same marked benefit. There was considerable retention of urine throughout, but she always voided it freely when under the influence of chloral. I soon came to know to a positive certainty that this would be so, and was often saved the necessity of using the catheter—a most difficult and dangerous operation in such a case. The bowels, also, although very torpid at other times, frequently acted without medicine when she was under the influence of chloral. This patient is now quite well.

Case 3.—Mr. ——, a farmer aged 73, a man who had hitherto enjoyed perfect health, was found lying insensible on the floor on the 14th February, an hour after he dined. This state of profound stupor lasted for about forty minutes, when he fell into violent convulsions, which continued, with slight remissions, for nearly five hours. My friend, Mr. Logan, was associated with me in this case. The temples were leeched, ice applied to the head, the bowels acted upon by enemata, and we then left him lying perfectly quiet, but in a state of profound coma. The pupils were contracted and fixed, face flushed, and the pulse slow and laboured. I found him next morning acutely maniacal, being kept in bed with the utmost difficulty by three powerful men. He had been in this state for eight hours. I gave him 40 grains of chloral, and in a few minutes his struggles and cries ceased, and we laid him down in bed. I found his bladder to be very much distended, and used the catheter; but before the instrument was withdrawn he fell into a profound sleep, which lasted, with interruptions, for forty-two hours. The interruptions in question were, that during the course of this prolonged sleep he wakened up about every five hours, asked for a vessel in which to make water, voided it freely, took a drink, and dropped over again into a deep slumber. When I entered the house a few hours after this long sleep, I found him, to my intense astonishment, up, dressed, and reading the newspapers.

the first we aim to sustain the organic functions so effectively that the poisonous vapour may be lifted out of the system, and the organic functions be therewith restored. By the second we aim to neutralise the poison, or to counteract its effect, by the employment of some opposing agent or principle.

In pursuit of the natural method I have studied many plans—artificial respiration, electrical excitation; artificial circulation, transfusion. For full particulars of these researches I must refer you to my papers in the Proceedings of the Royal Society and in the Medico-Chirurgical Review, for July, 1862. For the present moment I confine myself to two of these methods alone—artificial respiration and electrical excitation. These are the two methods best known and most commonly used; and if I define clearly their values I shall not only leave some practical facts on the mind, but shall lead up to future advances towards more accurate knowledge and experience.

On the human subject artifical respiration is followed out simply in order to imitate natural respiration; while galvanism is followed, in a less definite manner, by some to excite respiration, by others to excite the heart, occasionally for neither of these reasons, or for both. In my researches I and no ill results were at any time observed. We have seen a very similar have usedartificial resp iration for the same simple purpose as it is used on the human subject, striving only to make it perfect; while I have used galvanism for three distinct purposes: First, to excite and sustain respiration; second, to excite and sustain the heart and respiration; third, to excite the heart while the respiratory process was sustained by artificial respiration.

You will ask, immediately:—Can anything be done? I answer immediately:—Yes. I answer that in some cases where death from chloroform appears to be perfect—where if nothing were done, the animal would be dead—life can be restored; can be restored with certainty in a given number of cases out of a given number of deaths—in one case out of three, I may venture to say without fear of saying more than is true. We find at the same time that the result is not the same after each mode of death. It is most easy after the first mode, less easy after the second, and rarely possible after the third. I have not tried it after the fourth, but I should infer that it would be nearly the same as after the first mode. What is more—and the fact is as singular as it is obvious—the restoration of life is much more easy during cold and cool than it is during hot weather. When the temperature of the day is between 70° and 80° Fahr. the experiment usually fails. Lastly, the experiment usually fails if the chloroform be administered for several minutes before the narcotism passes into death.

The plan for restoration which, up to this time, succeeds, and the only one which succeeds, is that of careful, delicate, but at the same time steady artificial respiration by the double acting bellows, which I have already described.* So soon as respiration and the other evidences of life have ceased, we insert the exit tube of the bellows into the nostril and empty the lung by a stroke of the bellows on the emptying side; then we gently inflate, and next empty and fill in alternate stroke. Let us proceed to demonstration. We put a large well nourished rabbit gently to sleep with vapour of chloroform, we carry on the administration quickly, and, as you see, at the end of four minutes the animal has ceased to breathe. We may let it lie in this way a full minute, but we must not move it or handle it. The least pressure with the hand on its thorax or abdomen, or the lifting it up quickly, would be fatal to success. Now we introduce the nostril tubes of the bellows and first exhaust the chest, then fill, and in the end exhaust and fill steadily some twenty to twenty-five times a

* The double acting bellows were described in the lecture on artificial respiration, published in the last volume of the *Medical Times and Gazette*. The bellows are made by Messrs. Krohne and Seseman, of 8, Duke-street, Manchester-square, whom I have much pleasure in thanking for the intelligent pains they have taken in carrying out my design. The bellows are inexpensive and are useful for other purposes than artificial respiration. *Retrospect*, vol. lxi., p. 90.]

minute. We must wait patiently for three or four minutes, keeping up the respiration before we can expect a result; and while we wait let me narrate this peculiarly interesting circumstance, that in proportion to the time allowed to elapse between the death and the restorative process, so must time be allowed for continuing the artificial respiration. If the animal die at once and the artificial respiration be commenced at once, one or two strokes of the bellows are often sufficient to restore independent life; but when, as in the present case, the time is long before respiration is artificially set up, then some moments must be allowed for recovery. Why is this? It is because the respiratory muscles and their nervous centres must be recharged with blood before they can take on their action again, a slow process when the motion of the heart is all but extinguished.

We persevere, and now observe we are about to be rewarded with success; if you watch closely you will perceive a tremulous muscular movement in the flank of the animal; it is followed by an inspiratory effect. The muscles are now recharged with blood, and the organic nervous centres are recharged, and this effected, I know, by experience, I have done enough. I remove the little tube from the nostril and let the recovery be completed by natural respiration. The animal will in time awake as if nothing had happened to it.* Was the animal in this case dead? It was practically, is was not actually. The brain was dead, the cord was dead, the voluntary muscles were under no stimulus; the semi-voluntary muscles were under no stimulus; but there was one organ, which though we could not discern its motion was in feeble action; and that organ was the heart. By our gentle manipulation we restored the heart; it recharged itself, it slowly recharged the other muscles and the nervous centres with blood, and at last there was natural action. The experiment is so easy to perform, so uncomplicated, it would appear as if it ought always to succeed; and it would always succeed if we knew a little more. But at present we only know certain causes of failure, of which there are several. Sometimes we fail because the system is too fully charged with chloroform; sometimes because the column of blood from the right to the left side of the heart is broken; sometimes because the pulmonary vessels are contracted; sometimes because there is coalescence of the blood corpuscles from stasis and plugging of the minute ramifications of the pulmonary artery; sometimes because the blood coagulates, and this especially if the temperature of the air is high; sometimes because, again under high temperature, the muscles soon become rigid; and sometimes, it may be, because the nervous centres suffer molecular change so that they fail to recharge and resume function. These seem many difficulties, but really they are closely allied, and one day we shall see a mode of overcoming them altogether. Then the results will be much more striking than they even now are.

So much for artificial respiration; next, as to electrical action. I have employed electricity, as before said, with three objects in view, and I have used it in various ways: as frictional electricity, as continuous current, as an intermittent current. On the whole, I find the best apparatus to be this convenient little persistent battery made by Schmidt and Robinson, of the Strand. If anything could be effected by the excitation of muscles from electrical action, we have in the instrument before us all we could reasonably desire.

Let us again proceed to fact. We have narcotised another rabbit rapidly until it is practically dead. We could restore the animal if we pursued the same method as in the last experiment: we will use the battery instead. We will use it first with the object of restarting muscular motion in the respiratory muscles. For this object some, in the human subject, put a needle from one pole into the tract of the phrenic nerve, and then apply the opposite pole to or over the diaphragm. Others put the needle

* The animal made a perfect recovery in this case. It lay without evidence of life for the full period of six minutes and a half, the longest period I have as yet known to be followed by recovery.

under or subcutaneously upon the larynx—in plain, the position is of little moment if the second pole be in contact directly or indirectly with the diaphragm. I will bring one pole by a needle in contact with the larynx and the other in contact with the diaphragm. And now when I make and break contact you see the respiratory act is perfect; the air enters the lungs readily, and I bring back inspiration and expiration as faithfully as if I were filling and emptying them with the bellows. I continue this action, but note what soon occurs: the muscles begin to respond more feebly, and quickly cease to respond; I gently increase the current, and by this renewed action is seen again; at last the organs cease to act under any current; but if I change the current and pass it through the limbs of the animal the muscles of the limbs respond readily enough. Why not then the muscles of respiration? Because we have exhausted them by the electrical action: when I was sustaining respiration by the bellows my hand supplied for the time the respiratory power of the animal. I gave the force, and the muscles of the animal rested and restarted. When I used the electrical stimulus I took out of the muscles what remaining force was there—the primary force required for recovery—and under a semblance of restoring life clenched death.

But let us go one step further; this animal could not be restored now by any known method: we will then open the thorax and look at the heart. At first sight the organ is seen at perfect rest, but in contact with the air it recommences to pulsate, and in a minute or so the auricle and ventricle on both sides are in rhythmical action. We will repeat the electrical current, letting it now pass through the heart at the lowest power. Observe what occurs: at once the organ flags and stops in ventricular systole. We have exhausted the heart as we previously exhausted the respiratory muscles.

I thought once it might be well to combine electrical excitation of the heart with artificial respiration by the hand-bellows. I had no success like that which follows simple artificial respiration, and after these experiences I feel it too unreasonable to recommend galvanic action as a means of resuscitation. Galvanism is a two-edged sword. It might, by accident I may say, in some cases, restart respiration, but it would in this respect be inferior in principle to artificial respiration, and in the majority of cases it would more effectively promote death than restore life, even when used with the specific object of exciting the respiratory muscles into natural play, or of exciting the heart. When used as it commonly is used merely to excite prolonged contraction of muscles, it is not aimless merely but positively mischievous.

Still the phenomena excited by galvanic action, though as yet deceptive, are not to be ignored; one day we may see how to use the electrical excitation with advantage, and on a known principle: but that day has not arrived.

Antidotal measures.—It has been hoped to neutralize the physological action of chloroform by injection of antidotes into the veins. I tried the injection of ammonia into the veins as far back as the year 1854, and although the injection exrited the heart it did not offer any material advantage. Liebreich has recently referred to strychnine as antidotal to chloroform. I had already tried that also without obtaining any indication of good result; on the whole the antidotal method is hardly applicable to chloroform. If a man or an animal is not practically dead from chloroform, if he still breathes, and circulates, however feebly, he will recover best by being allowed to recover spontaneously; if he be practically dead the remedy is not an antidote, but a method by which the natural process of life may be correctly imitated in the motionless organism—a method carried on by force supplied from without until the inner force is re ivified.

The final question before us, the summary, is this: When there is a death from chloroform what shall be done? I answer that at present we know of one process which may succeed, and that if it do not succeed we know of none other that can take its place. That process is prompt arti-

ficial respiration. But artificial respiration must be done properly to be effective; it must be done with the body at perfect rest; it must be done as we have done it here in our experiments by a double-acting bellows or pump which shall exhaust and fill the chest with air. It must be carried out steadily and gently; it must be withdrawn when there is any natural effort at respiration; it must be continued until a puncture of a vein shows that there is coagulation of the blood. Above all, it must be absolutely trusted until some new and definite advance is made, the soundness of which is demonstratable by direct experiment. If to every hospital operating table and to every private operating chair a double-acting pump or a bellows were permanently attached and always ready for use, and if in emergency it were at once brought into action methodically and with fixed purpose, under the surety that if it failed all means will fail; if the body be kept meanwhile in entire repose, so that no violence nor shock be allowed to check the little remaining power of the heart, then I believe, from experimental data, that at least one in every three or four of the cases now ending fatally under chloroform would be saved.

And still there would remain work enough to be done: work to improve further the process of resuscitation as a general process; work to find an agent for anæsthesia which shall destroy sensibility, but shall not possibly endanger life.—*Medical Times and Gazette, May* 28, *and July* 23, 1870. *pp.* 574, 85.

109.—CHLOROFORM ADMINISTRATION.

By Dr. A. Ernest Sansom.

[The following short article is a critique upon some remarks in Dr. Richardson's paper on chloroform.]

All attempts to insure greater safety by the use of chloroform diluted with volatile media are at once condemned by Dr. Richardson as puerile and empirical. A table is given showing the great differences in specific gravity, vapour density, and boiling-point of the agents which are commingled, and from these figures it is supposed that the question is to be judged. I hold on the other hand that a dilution of chloroform with an equal bulk of absolute alcohol effectually insures the administration of an atmosphere containing as nearly as possible one-half the percentage which results when undiluted chloroform is employed. This is not at all a question of vapour densities and boiling-points. It is not pretended that the evolved chloroform-vapour is diluted *pari passu* with the vaporised alcohol. As I have before stated the alcohol acts chiefly in restraining the volatility of the chloroform, and thus indirectly inducing a free dilution by favouring the admixture with air. This is no vague generalisation, but a deduction from experimental facts; and the success of the practice of thus inducing anæsthesia is attested by competent observers.

Dr. Richardson agrees with me in his estimate of the dangers of strong atmospheres of chloroform, especially at an early stage of the administration. His explanation of the exact source of the danger, however, requires reconsideration. Adducing Prof. Rutherford's observations on the effects of other irritant vapours as analogical evidence, Dr. Richardson concludes that when chloroform induces cardiac syncope it acts by stimulation of the inferior branch of the vagus by the asphyxiated condition of the blood. This is no new theory; it was enunciated by Brown-Séquard; it is upheld by Dogiel (Reichert's und Dubois' Arch. 1866). But the researches of "Scheinesson (Untersuchungen über den Einfluss des Chloroforms auf die Warmeverhältnisse des thierischen Organismus und den Blutkreislauf;" Arch. des Heilkunde 1869, Hft. 1, 2, 3,) prove that this view is untenable. It is shown that chloroform has equally the power of slowing the heart's action in animals whose vagi have been previously divided. Even when the spinal cord was divided in the cervical region as well as the vagi and

sympathetic, the heart's action was enfeebled by chloroform. The irresistible conclusion, therefore, is that chloroform has a special power upon the musculo-motor system of the heart.

The danger of chloroform resides in the fact that in strong doses it is a direct cardiac depressant. Its vapour when freely diluted, emotional causes of danger set aside, induces anæsthesia with very little risk. By previously diluting the chloroform with alcohol we can so restrain its volatility as to insure against the administered atmosphere being too strong at any given moment. The measure is simple, safe, and practical. —*Medical Times and Gazette, July* 23, 1870, *p.* 107.

110.—ON THE THERAPEUTICAL USES OF CHLORAL.

By the Editor of the Medical Times and Gazette.

The physicians of the Royal Infirmary, Edinburgh, have had an ample field for observing the action of the drug in fever, and found it valuable in assisting and promoting recovery by palliating distressing symptoms, though it has no direct influence in cutting short the disease, or in any way affecting its natural course. "In doses of thirty grains, repeated every hour –two or three times if necessary—in most cases a quiet and refreshing sleep is produced, which serves greatly to maintain the strength of the patient." Appetite is sometimes apparently improved, and excitement and delirium are frequently diminished. Violent head symptoms may require increased doses, forty to sixty grains. And it appeared, "from a limited series of observations," that in fever chloral produces little or no effect on the temperature, as determined by the thermometer (Brit. Med. Journal, April 30, 1870).

We have already alluded to its value in *delirium tremens*, and considerable evidence of this might easily be adduced. Dr. J. H. Barnes records (*Lancet*, Nov. 27, 1869) ten cases of this disease treated by chloral, and in most of them quiet sleep was quickly induced. Dr. Cerenville found in a case of the disorder 15 grains repeated for two successive days procure sleep and calmness (L'Union Médicale, Feb. 12, 1870). In the Edinburgh Royal Infirmary it is found to be "almost a curative agent in this disease, as in most cases, notwithstanding violent excitement or delirium, it produces a prolonged sleep, from which the patient frequently awakes sane and rational." And numerous communications to the medical journals, at home and abroad, might be quoted to the same effect.

In *acute mania* its effects are of the highest value. Dr. G. Crawford has related (Med. Times and Gazette, Jan. 22, 1870) a case of acute mania in a female, who had not slept during five consecutive minutes for five weeks, and who had taken opium and morphia without benefit. He prescribed twenty-five grains of chloral for three nights in succession, and its effects were marvellous. Tranquil continued sleep was procured, and the patient rapidly recovered. In two maniacal females, whom baths and opium had failed to tranquilise, Dr. De la Harpe found that thirty grains of chloral almost immediately caused sleep (L'Union Médicale, Feb. 1870); and Dr. J. B. Tuke, Dr. Clouston, Mr. R. Gardiner Hill, and others have found it as Dr. J. B. Tuke terms it, "the most valuable means of producing sleep which has yet been introduced into the pharmacopœia of the Asylum Physicians."

Dr. Clouston (Brit. Med. Journal, May 7, 1870), a most accurate and trustworthy observer, after having given it in forty cases of various forms of insanity, has thus summed up his experience of it:—"It has proved a most safe and certain sleep-producer; by it we can compel sleep in any case. By means of this property attacks of insanity may probably be warded off in some cases. Its action in abating and soothing excitement *is more* uncertain than its sleep-producing power, and lasts a shorter time

than that of any signally powerful drug, but is most valuable in certain cases, especially in some recent and curable ones, where formerly we should have been afraid to give opium. Whether it does good or not, it never does harm; and is in this respect the very king of narcotics. It generally reduces the temperature slightly, but in maniacal excitement not nearly so much as does alcohol in large doses. It should be given to subdue brain excitement in doses beginning at twenty or thirty grains, repeated in from three to five hours. To produce sleep in great excitement, from forty to sixty grains are required, the latter dose not failing in one per cent. of the cases."

Dr. W. Macleod also has contributed (Practitioner, Aug. 1870) a valuable paper on the action of chloral in *Paralysis of the Insane.*— He reports that when the patients are destructive and violent, the judicious administration of the drug acts as an excellent hypnotic by night, and soothing agent by day; that under its action patients have been free from destructive habits, and have gained in weight and strength; the action of the bowels and bladder have improved, and appetite has increased; that it lessens abnormal sensations, often cuts short hallucinations of hearing, and stops the propensity of patients to hurt or maim themselves. He had also found that in melancholia convalescence is advanced by its employment.

In *puerperal mania* the chloral has proved of great value. Thus Dr. S. Teller relates a case in which morphia internally and by hypodermic injection was used without the least effect, and bromide of potassium caused excitement, but recovery took place under the use of the chloral. And Mr. A. M. Adams reports (Lancet Jan. 22, 1870) a case in which he had given bromide of potassium, Battley's sedative, and chloroform by inhalation without relief, but the chloral, in doses varying from 40 to sixty grains, produced calm consciousness, followed by from six to eight hours of quiet sleep. In *puerperal convulsions* again it has given great relief, followed by recovery, after the failure of belladona and the bromide of potassium (Mr. Hay in the Practitioner, March, 1870), and Baron von Seydewitz has reported to the Obstetrical Society of London (Med. Times and Gaz., April 16, 1870) on the efficacy of "The Chloral Treatment of Eclampsia."

In *chorea* a large number of cases have been recorded showing the remedial influence of the drug. Sir J. Y. Simpson tells us (Med. Times and Gazette, Jan. 1, 1870) that he has given it in continuous small doses for one, two, or more weeks in succession in chorea "and apparently with most marked benefit." M. Bouchut has in severe cases found it beneficial, and M. Bricheteau has recorded (Bullet. Gén. de Thérap., Nov. 1869) his conviction of its value in severe chorea in children. Dr. Russell also relates (Med. Times and Gazette, Jan. 8, 1870) a case of very severe chorea in an apparently healthy woman during the early months of pregnancy, in which bromide of potassium was useless, but the administration of chloral was followed by the happiest results.

It has been given also in *tetanus*, and recovery has followed. As it causes, when given in large doses, extreme muscular relaxation, it was natural to hope for benefit from its use in such a disease as tetanus, and M. Verneuil reported to the Société de Chirurgie (Med. Times and Gazette, April 30, 1870) a case of traumatic tetanus cured by chloral. The case was very marked and severe, the spasms affecting the muscles of the face, jaws, neck, spine, abdomen, and lower limbs, and resisting the influence of bromide of potassium and the hypodermic injection of morphia in large doses. But immediate relief was obtained by hydrate of chloral in full doses. In the course of the case, and a month elapsed before complete recovery, relapse occurred three times, and always when the chloral had been temporarily suspended. The daily dose varied from 3 jss. to 3 iij., and no ill results were at any time observed. We have seen a very similar case lately, under the care of Mr. Spencer Watson, in the Great Northern Hospital, ending, under treatment by chloral, in about the same time in perfect recovery. *And M. Verneuil* has also related to the Société de Chir-

urgie a case treated by M. Dufour, of Lausanne, by the chloral. The daily dose of the drug had to be carried to twelve grammes, but the patient left the hospital cured at the end of a month (Gaz. Hebdom., July 8, 1870). It may be objected, and in M. Verneuil's cases has been said, that in these cases the patients recovered by lapse of time; but, at any rate, the chloral exerted an invaluable remedial influence by procuring relief from spasm, by giving sleep, and allowing the patients to take nourishment. And though our experience of the action of chloral in this disease is not yet sufficient to warrant full reliance on it, yet it is certainly enough to encourage further trials; and our hope in it is strengthened by Liebreich's discovery that the action of chloral and that of strychnia are so antagonistic that strychnia is an anitdote in the case of chloral poisoning (Med. Times and Gazette, vol. ii., 1869, p. 723).

M. Marjolin stated to the Imperial Society of Surgery that he has administered the chloral internally to relieve the *severe pain from burns*, and with complete relief to the patient (L'Union Médicale, May 19, 1870).

It would be easy, did our space permit it, to add considerably to this list of the conditions in which the hydrate of chloral has proved remedial or highly useful. It has been employed with the happiest effect for the relief of the cough in advanced phthisis of the lungs, and has proved a very valuable anodyne in some cases of gastralgia, pleurodynia, hysteralgia, dysmenorrhœa, &c., in the pain attendant on cancer, and acute local inflammations, and in lead colic and other forms of colic. In cases also of irritable bladder and chronic cystitis it has been found to give much longer and more perfect rest than large doses of opium.

In *phthisis pulmonalis*, the Physicians of the Edinburgh Infirmary have found chloral most valuable for producing sleep, for soothing irritation, and for relieving cough. Dr. J. Hughes Bennett observes (Practitioner, May, 1870) that such is the loss of appetite, increased weakness, and emaciation which follow the use of opiates and chlorodyne, that he never gives them except in the last stages of the disease, "and when all hope of prolonging life having ceased, we choose the least of evils in procuring even unhealthy sleep. But matters are greatly changed when we are able to obtain the natural sleep that chloral gives. By its aid we can lull irritation, and give rest for a time, in many cases without any injury whatever." He gives the results of its employment in twenty-one cases, and in the vast majority "the relief to the cough and restlessness at night, with the production of sound sleep, was most marked, while the head, tongue, and appetite were in no way affected."

We may note also that Mr. E. Lambert has lately (Edin. Med. and Surg. Journal, August, 1870) given us an instructive report of his experience of "the influence exerted by chloral on the pain of parturition." He gives fifteen grains every quarter of an hour "till some effect is produced, and according to the nature of that effect the further administration is to be regulated." He finds that it "does not only not suspend, but rather promotes, uterine contraction;" that it is of great value; and that, while "it is *the* hypnotic for the first stage of labour," it may be administered under favourable circumstances "during and at the close of the second stage, with the result of producing absolute unconsciousness in the same sense in which we understand unconsciousness under chloroform."

Lastly, we observe that Mr. Lawson Tait has found the chloral a valuable adjunct to opium and chloroform. A smaller dose of morphia is required if a little chloral be also given, and when a patient is under the influence of chloral the inhalation of a few drops of chloroform suffices to produce profound anæsthesia (Med. Times and Gazette, vol. i., 1870, p. 193).

The very important question as to the reduction of temperature by chloral must be considered as yet unsettled. Dr. Richardson found that "during the narcotism produced by the substance there is invariably reduction of temperature," and "that in birds and rabbits the temperature may fall five, six, and seven degrees Fahr., and yet the animal may recover." And cases are not wanting to support the idea that it may be *of*

great value—given in moderate and frequently repeated doses—for this purpose. But, on the other hand, some observers have failed to note any such effect, and others have noticed a diminution of only one or one and a half degrees Fahrenheit.

The drug should always be given in small doses at first—gr. xv. or gr. xx.—with the view of observing its effect in each individual case. The particular conditions that contra-indicate its use have not yet been accurately defined, but weakeness of the heart, and marked cerebral anæmia must be held, we think to impose at least special caution in its employment. It may be given with perfect safety and perfect success to children, in doses of two grains to an infant of eighteen months, of three grains at three years of age, and of ten grains at nine or fourteen. As evidence of this, Mr. A. N. Adams has successfully given five grains three times a day, or six grains at bed-time, in a severe case of pertussis in a child of six years of age.

It is worthy of special note that when the chloral is given as a hypnotic, care should be taken, so far as is possible, to help and promote the desired effect by administering the drug at or near the accustomed hour of sleep, and by securing perfect quietude and rest to the patient. It has not unfrequently been observed to produce no effect except perhaps some slight unsteadiness or giddiness if the patient has been moving about or there has been any noise or disturbance in his room, while the same dose will produce quiet and prolonged slumber when the individual has been in bed, and in circumstances favorable to hypnotism.

We do not pretend to have stated all the conditions in which the hydrate of chloral has been found useful; and no doubt it will prove of value against some disordered state in which, so far as we know, it has not yet been tried. Thus Liebreich has suggested that, as chloroform has been given with the idea of its dissolving biliary calculus, the choral is preferable for that purpose as furnishing chloroform in a nascent, and therefore more active, condition.

But it has been amply proved that, while the chloral will of course sometimes fail to produce the desired effect, it is in a very large number of cases unrivalled as a hypnotic and anodyne. It is, as a general rule, in appropriate dose, as sure a producer of sleep and soother of pain as opium itself or any of its preparations. It is more swift in action, more prolonged in effect, and produces a more calm and tranquil and innocent sleep. Sir J. Y. Simpson observed, "Ever and anon cases are well known to occur in practice in which patients declare their inability to take opium in any form without suffering severely from nausea, faintness, restlessness and other evil effects. In several such cases I have used chloral as a hypnotic with perfect success." And again, it has been found "to produce its hypnotic effects where opium, from long-continued use, had ceased to do so." But its highest value, its greatest superiority, lies in the fact that the sleep it induces is nearer in character to natural sleep, to the sleep

> "That knits up the ravelled sleeve of care;
> The birth of each day's life, sore labour's bath,"

than that excited by any other artificial means. Chloral sleep is much more natural than the sleep produced by opium, hitherto the most powerful and certain hypnotic. Dr. J. B. Russell (*Glasgow Med. Journal*) has well pointed out the differences:—"In both, as in natural sleep, the pupil is contracted to the utmost, but in chloral sleep it immediately dilates on awaking, just as in natural sleep. This is not the case in opium sleep. Again, chloral sleep is more natural in this respect—that the sleeper may be roused at any time, and at once recovers the full command of his functions; he may take food, pass urine, cough with full strength, expectorate, &c., and, as soon as the temporary excitation ceases, he may drop over again into unconsciousness. Not so with opium. The excretions are not disturbed by chloral. They are by opium."

The chloral sleep is, as already observed, gentle, calm, prolonged, refreshing, and followed by no unpleasant effects.—*Medical Times and Gazette, Aug.* 20, 1870, *p.* 207.

111.—NOTES ON THE HYDRATE OF CHLORAL.

By Alex. Maxwell Adams, Esq., Surgeon, 2nd Royal Lanark Militia.

[It is open to question whether the theory upon which the action of chloral is explained, beautiful though it is, is really true. It is not unlikely that it acts as a whole, and that its action is more likely to be weakened by the decomposition in question than otherwise. Whether true or not, however, it was the theory which led to the discovery of the fact.]

Although the mode of action of chloral may be involved in doubt yet there can be none as to its value as a remedial agent, and I therefore beg, in the following rough notes, to briefly state the result of my experience. which has been somewhat varied, and has extended over a period of five months:—

As an Anodyne.—Chloral, as a general rule, will not alleviate severe and persistent pain where it fails to induce sleep, its anodyne and hypnotic action being, in a great measure, dependent the one upon the other. Where the functions of the brain are intact, and the dose is a medicinal one, the hypnotic action of chloral is rarely so profound as to destroy all feeling or means of communication from without; therefore the paroxysm of aggravated neuralgia, for instance, will often suspend the action of the largest dose of chloral which it is safe to give. I have had two such cases lately under my care. I have found both patients (females) susceptible to the influence of 20 and 25 grain doses, *during the painless intervals*, but have entirely failed with 40–50, and on one occasion with 60 grains, to produce any effect whatever, *so long as the paroxysm lasted.* Immediately upon its cessation, however, such doses took instant effect, two, three, four and five hours after administration. Chloral, when it is not likely to be retained by the stomach, may be given as an enema with success.

Case 1.—I was sent for the other night to visit an old patient labouring under excruciating pain in the stomach, attended with violent retching and vomiting. For some years past I have had this woman occasionally under my care, similarly affected, and have always found the attacks to be most obstinate and distressing. On this occasion I ordered one drachm of chloral to be dissolved in a wineglassful of fluid starch, and given as an enema. She slept within thirty minutes, and awoke six hours afterwards feeling well and free from pain. The pain did not return. Although chloral has failed in my hands to afford much relief in severe outward pain, more especially of a neuralgic character, yet I have found it highly beneficial in many cases of internal pain, viz., of the stomach, bowels, bladder, womb, &c. Case No. 1 is a fair sample, and I could give many. Chloral, however, upon the whole, is inferior to opium for anodyne purposes.

Chloral as a Hypnotic and Sedative in Functional and Organic Diseases of the Brain and Nervous System.—Opium is inadmissible in the treatment of many such cases, hazardous in some, and uncertain in all, often leading to results the very opposite of what was anticipated. The converse can be said of chloral—it is contra-indicated in no case where a sedative and hypnotic are required, and is safe and certain in all, leading to no other results saving those anxiously looked for. We have stood by the bedside of many a sad case, have given opium—only to aggravate, however—and have been obliged in reality to leave our case to sink or swim very much in the hands of nature, assisted by powerful nurses, strait-waistcoats, canvass sheeting, &c. All this is changed since the discovery of chloral. No matter how wild the delirium, how acute the mania, how frightful the con-

vulsions, we can now with almost positive certainty predict that there will in a few minutes be calm repose. The following cases will serve to illustrate the above:—

Case 2.—Mrs.——, a fragile, delicate woman, was seized with *acute mania* four days after the birth of her first child. This was the most aggravated case of the kind it is possible to conceive, her struggles and cries defying all description. Gave two doses of bromide of potassium without benefit, then forty minims of Battley, which was repeated at the expiry of two hours, equally without result. I then put her under the influence of chloroform, thinking thereby to aid the opium in producing sleep, but still with no effect. I was now *hors de combat*, and could do little more than assist in the adjustment of sheets, for the purposes of restraint, as her head had been already shaved, ice applied, leeches, &c. This was on the 29th November, when chloral, as a therapeutic agent, was in its infancy. Having read an early notice by Liebreich regarding its efficacy, it now occurred to me to telegraph for a supply, which fortunately arrived in time to be of service, as my patient appeared to be *in extremis* when I administered the first dose—her extremities were cold, her pulse a mere vibration, and hardly perceptible at the wrist; but her cries and struggles continued unabated. I had, in fact, to extemporise a strait-waistcoat, as no manual force could keep her in bed. I administered 40 grains, and, as if by magic, in about five minutes she became quite calm and sensible, complained of great drowsiness, and within ten minutes fell into a profound sleep, which lasted for seven hours. Her pulse gradually gained in volume and diminished in frequency until it fell to 90 beats. She breathed rather quickly and heavily for the first two hours, but afterwards the sleep was natural and even light. Great drowsiness all next day; pulse improving; takes food, and is tolerably sensible. Towards night the mania returned with great fury; gave 40 grains of chloral as before, with exactly the same results—namely, an almost immediate return of calm consciousness, followed by a prolonged but natural sleep; I was obliged to continue the use of chloral at intervals, for about two months, in this case, and always with the same marked benefit. There was considerable retention of urine throughout, but she always voided it freely when under the influence of chloral. I soon came to know to a positive certainty that this would be so, and was often saved the necessity of using the catheter—a most difficult and dangerous operation in such a case. The bowels, also, although very torpid at other times, frequently acted without medicine when she was under the influence of chloral. This patient is now quite well.

Case 3.—Mr. ——. a farmer aged 73, a man who had hitherto enjoyed perfect health, was found lying insensible on the floor on the 14th February, an hour after he dined. This state of profound stupor lasted for about forty minutes, when he fell into violent convulsions, which continued, with slight remissions, for nearly five hours. My friend, Mr. Logan, was associated with me in this case. The temples were leeched, ice applied to the head, the bowels acted upon by enemata, and we then left him lying perfectly quiet, but in a state of profound coma. The pupils were contracted and fixed, face flushed, and the pulse slow and laboured. I found him next morning acutely maniacal, being kept in bed with the utmost difficulty by three powerful men. He had been in this state for eight hours. I gave him 40 grains of chloral, and in a few minutes his struggles and cries ceased, and we laid him down in bed. I found his bladder to be very much distended, and used the catheter; but before the instrument was withdrawn he fell into a profound sleep, which lasted, with interruptions, for forty-two hours. The interruptions in question were, that during the course of this prolonged sleep he wakened up about every five hours, asked for a vessel in which to make water, voided it freely, took a drink, and dropped over again into a deep slumber. When I entered the house a few hours after this long sleep, I found him, to my intense astonishment, up, dressed, and reading the newspapers.

He attended church and market for about a month after his attack, but is now paralysed and breaking up.

Case 4.—I was called hurriedly, about a month ago, to visit Mrs. ——, a highly nervous woman, who had been much annoyed for some time, and had passed many sleepless nights. I found her with a flushed face, and quick bounding pulse. At times she talked incoherently and struggled violently, at others became quite rigid, resting upon the back of her head and heels. I gave her 30 grains of chloral; symptoms improved, but no sleep; gave her 30 grains more in an hour, when she slept in about four minutes, and wakened up eight hours afterwards quite calm and collected; no return of delirium.

Case 5.—*Delirium tremens* complicated with *rheumatic fever*. Has not slept for eight days. Considerable delirium. April 11th, 8 p.m. Gave 30 grains of chloral. No effect. 9 p.m. Repeated the above dose. 9.40. Sound asleep, and slept continuously for *five* hours. Wakened up for a few minutes, and then slept calmly and soundly for three hours. April 12th. Very drowsy all day, and has had broken snatches of sleep. Delirium quite gone. Got somewhat restless towards night. Ordered 35 grains of chloral. A few minutes after administration showed symptoms of *gentle intoxication*,—singing, &c. Was sound asleep in half-an-hour, and slept uninterruptedly for three hours. Had a good deal of broken sleep for many hours after. Patient now quite rational. No return of the delirium. This, and one other, are the only cases in which I have seen anything like excitement to precede sleep. The chloral was longer in acting in this case than in any of my other cases, but the result has been equally satisfactory.

Case 6.—*Tubercular meningitis* of three weeks' standing in a child aged four. Has been convulsed for the last three days. April 11th. Ordered five grains of chloral to be given with a little syrup and water every three hours, until a sedative effect was produced. Had three doses. Convulsions ceased after the second, and I found the little sufferer now lying in a peaceful sleep. April 12th. A threatening of convulsions towards night. Five grains to be given, and repeated in two hours. Slept calmly all night, and was perfectly quiet all next day. Eyesight gone for days, and pupils quite insensible. April 13th. Return of the convulsions. Ordered chloral as before. Same effect. Prolonged sleep, and a state of perfect calm enduring all next day.

I shall now consider the other cases in which I have used chloral with benefit. In severe *paroxysms of asthma* I have found it to relieve the spasm and to induce sleep. In *congestive bronchitis* it has proved equally beneficial in my hands. In such cases, from 20 to 30 grains may be given as a hypnotic and sedative. In irritating and exhaustive *coughs*, chloral may be given simply as a sedative in from 10 to 15 grain doses two or three times daily, either alone or combined with expectorants, as the case may demand. Chloral is quite a safe remedy in pulmonary affections, as it does not inspissate the mucus, tend to congest the lungs, stifle cough, or interfere with the play or action of the organ in any way. In several cases of asthma and congestive bronchitis I have induced profound sleep by a 30 grain dose, and in each individual case the patient has been able to sit up in bed and cough and expectorate, just as if he had been in a natural sleep. I have used chloral very largely in *whooping cough*, and can give it the highest commendation. In urgent cases it will often check the development of serious head and chest complications, by mitigating the cough and soothing nervous irritability.

Dose of Chloral, and Mode of Administration.—In all my urgent cases, I have given as much as 40 grains for a first dose, without observing any alarming or injurious effects, and, in the after treatment of such cases, have given as much as 60 grains, with a like negative effect as regards danger or injury to the system. Dr. Russell, in his very valuable paper, in the February number of this *Journal*, has clearly demonstrated that *40 grains is* an overdose in the treatment of the delirium of typhus; but I

think that other cases will frequently present themselves to the general practitioner where 40 grains will prove the most efficacious first dose. The strength and constitution of the patient, conjoined with the severity of the symptoms, must, however, regulate the dose in a great measure. As a rule, 30 grains are usually sufficient to produce all the sedative and hypnotic effects peculiar to chloral, and if such a dose should fail, a second and similar quantity may be given within the hour. This is a safe mode of administration, by which you are enabled to discover, without risk, what quantity of chloral your patient actually requires, should it be necessary to recur to it again. Never give more than 40 grains for a first dose; never, I would say, give more than 60 at once under any circumstances, and be perfectly certain in your own mind, by previous administration and careful observation, that such a dose can be tolerated, in any case, before it is ventured upon. I generally give such doses in six drachms of syrup and six of water. The above remarks are applicable to serious and urgent cases, such as acute mania, *delirium tremens*, convulsions, phrenitis, and all similar aggravated forms of head and nervous affections. In milder cases, from 20 to 25 grains will generally soothe and induce sleep. For children the dose depends entirely upon the age. One grain for every year I consider to be a safe rule.

Dangers of Chloral.—In an overdose chloral is likely to overpower the brain and action of the heart. It is quite a safe remedy, however, if given with ordinary caution and judgment.

Therapeutic and Physiological Action of Chloral.—In most cases chloral induces sleep in from ten to twenty minutes, the patient dropping calmly and naturally into a deep slumber. The sleep thereby induced, save in exceptional cases, usually lasts from four to eight hours. I speak of continuous sleep. The sedative action of the drug, leading to drowsiness and snatches of sleep, is usually maintained for twelve or fifteen hours. You can raise your patient out of a chloral sleep to full consciousness almost at any time. Pain, or a strong desire to void urine, will often do this without your interference. Chloral does not constipate the bowels, paralyse the bladder, dry up the bronchial tubes, or otherwise interfere with the action of the respiratory organs, like opium; neither does it lead to any of its disagreeable after-effects, such as nausea, giddiness, head-ache, depression of spirits, &c. Chloral not only does not lead to torpidity of the bladder and bowels, but would appear, owing to some peculiar reflex action, to stimulate them to a more healthy condition where such a state of matters already exists. (See Cases 2 and 3.)

Chloral does not lead to congestion of the brain, and is therefore peculiarly applicable to the treatment of head affections. The pupils are always contracted, when there is no dilatation from other causes, under the chloral sleep. They immediately dilate, however, when the patient awakes or is roused. Chloral lowers the action of the heart and reduces the temperature of the body when such action and temperature are above the standard of health—but in cases of feeble circulation I have found it to act as a gentle stimulant, restoring and equalising the circulation throughout the outer surfaces of the body and extremities. The breathing is quickened for the first two hours, or thereabouts, after the successful administration of chloral, but it soon falls to what we are accustomed to see in natural sleep. The sleep of chloral is more allied to nature than that induced by any other drug, and comes on with much greater speed and certainty. Patients who have habituated themselves to the use of opium, and who are consequently unsusceptible to its hypnotic and sedative influence, are quite amenable to the action of chloral.—*Glasgow Med. Journal, May*, 1870, *p.* 364.

112.—ON THE DOSE OF THE HYDRATE OF CHLORAL.

By Weeden Cooke, Esq.

[The claims of chloral upon our notice and critical examination are no ordinary ones. This must be our apology for introducing so much upon this one subject in this and our last volume.]

Since the publication of my short report on this subject, I have had occasion to prescribe the chloral for a young lady aged 22, having a painful mammary tumour which much disturbs her rest at night. Fifteen grains make her quickly drowsy, and she sleeps well till morning. A case of uterine cancer, relieved by ten grains three times a day, began to complain of pain again, and fifteen grains were prescribed. The effect was remarkable. She was, as reported by both house-surgeon and nurse, intoxicated by each dose, and of course it was reduced. In a case of cancer of the tongue made comfortable by ten grains three times a day, the patient caught severe cold and became restless at night. Twenty grains were ordered at bed-time. He complained of headache, and too great drowsiness, and upon the reduction of the dose to fifteen grains, he was relieved of any unpleasant symptoms, and sleeps all night. In one case only, an old woman with advanced cancer of the breast and solid œdema of the arm, have I had occasion to exceed the twenty grains as a night draught. At first she was made perfectly comfortable with twenty grains, but now she is taking thirty-five grains most beneficially. I have no bias or reticence in the matter. I only want to secure that we shall not lose the great advantage which this drug seems to offer us by any possible mischances in its administration. If I might be allowed to make a suggestion for safety's sake, I would counsel that ten grains should be the primary dose, and then let it be increased if necessary, *secundum artem*. There is still the delicate question of the standard quality of the drug, which may have something to do with diversities of effects.—*Lancet, June* 4, 1870, *p.* 821.

113.—ON THE HYDRATE OF CHLORAL.

By Dr. Thomas James Woodhouse, Fulham.

At the Royal Hospital for Incurables, Putney, there is a patient suffering from cancer. She was admitted at the end of last year, and for a long time I tried a number of drugs to ease her intense suffering—opium, morphia, and cannabis, but they all had but very transient effects, and were followed by derangement of stomach.

Seeing by a recent number of the Lancet that Mr. Weeden Cooke recommends hydrate of chloral in ten grain doses three times a day in such cases, I determined to make a trial of this drug. She accordingly took ten grains three times daily, beginning May 12th. The next day she was certainly better; she had had a good night, but the pain was not altogether gone; there was no sickness nor headache. She was directed to take a dose when in pain. To my great satisfaction she had to take only one or two doses; for from that time to this, she has had no return of pain.—*Lancet, June* 4, 1870, *p.* 821.

114.—ON THE HYDRATE OF BROMAL.

By Dr. E. Steinaur, Berlin.

There is a valuable article by Dr. Steinaur, in the last volume of "Virchow's Archiv," on the action of the hydrate of bromal on animals and on man. The experiments were made in the Berlin Pathological Institute, and were under the immediate observation of Liebreich himself. The

hydrate of bromal, according to the observations detailed, when administered to animals, undergoes a similar change to that undergone by chloral, being converted by the alkalies of the blood into bromoform. But this change goes on slowly, for at the end of an hour and a half there was found in the blood in addition to bromoform still some undecomposed bromal. The substance is further oxidised and evacuated in the urine as bromide. The symptoms produced by bromal on animals (frogs, rabbits, guinea-pigs) were first a stage of restlessness, followed by imperfect sleep and anæsthesia, and finally dyspnœa and death with or without convulsions. After large doses, both in frogs and rabbits, the heart was found after death relaxed and distended,—whereas, after smaller doses, it was contracted. In the former case there is probably direct paralysis of the heart by the bromoform, such as occurs after large doses of chloroform. The preliminary stage of restlessness which has no equivalent after administration of chloral, is ascribed to the action of the bromal aldehyde itself, the decomposition occurring, as stated above, more slowly than is the case with chloral. The author observed a stage of restlessness after a hypnotic dose of chloral in a patient suffering under gout, and he ascribed this to the acid state of the blood preventing the usual decomposition into chloroform. With this view he administered alkalis to the patient, and after a few days the same dose of chloral produced the usual hypnotic effect. Proceeding from this he applied the same principle in his experiments with bromal. Having injected carbonate of soda subcutaneously in rabbits, he then injected the hydrate of bromal, and found that the stage of restlessness was entirely absent. The author has administered bromal to man in only a few cases. He has found good effects from it in epilepsy, and in soothing the pains of tabes dorsalis. The method of administration which he has ultimately employed is, first, in the morning and at mid-day a powder containing about 14 grains sodæ bicarb.; then in the evening two to four pills, containing each from ½ grain to 1½ grain of bromal.—*Medical Press and Circular, Aug.*, 24, 1870, *p.* 154.

115.—ON NITRITE OF AMYL, AND SOME OTHER NEW REMEDIES.

By Dr. Benjamin Richardson, F.R.S.

Nitrite of Amyl.—The physiological action of nitrite of amyl is, as we have learned, directly exerted on the ganglionic nervous tract; it paralyses so that the nervous supply over the extreme vascular system is impaired; and the muscular system generally, if the effect be sustained, is thrown into relaxation. The observation of this effect of the nitrite led me to suggest it primarily as a remedy for excessive spasmodic action—for tetanus especially—and it has been applied in the direction thus pointed out with much success. Lately, Mr. Foster, of Huntingdon, has administered the nitrite with complete success in a case of traumatic tetanus—holding the convulsions in check for the long period of nine days. The nitrite is best administered by inhalation, five minutes on a piece of folded linen or handkerchief being the dose for an adult. The remedy will act if it be given by the mouth; but as the action is very energetic, and requires to be kept under the control of the administrator, it is much safer to administer by inhalation. In tetanus, the periods of recurrence of the spasmodic attacks should be carefully watched, and when the paroxysm is threatened, the inhalation of the nitrite should commence so as to subdue the spasmodic seizure. In spasmodic angina, in asthma, and in colic, the agent has been administered also with success.

It must be clearly understood that the action of the nitrite is curative only in so far as it controls the spasm in the cases named—that is to say, it prevents death, and so leaves time for recovery. I observed originally, and on the observation the suggestion of the practice is founded, that frogs under strychnine tetanus are immediately relieved of spasm by the

nitrite of amyl, and that with great care in keeping the animals free of spasm, they can be sustained until the strychnine is removed from the body, when there is recovery; and in this explanation I define the true place of the nitrite as a remedy. In tetanus the administration of the nitrite is not to be considered as displacing other rational means of cure. On the contrary, it favours other means: it enables food to be freely supplied, it gives time for the action of purgatives and diuretics, or for the employment of the hot-air bath.

Caustic Ethylates.—The construction of the ethylates of potassium and sodium was described at the early part of this lecture. The ethylates are crystalline substances, in which one atom of hydrogen of absolute alcohol is substituted by one of potassium or of sodium. Brought into contact with the body, the ethylates at first produce no action, but as they pick up water from the tissues they are decomposed, the potassium or sodium is oxidised, yielding caustic potassa or soda in the fresh state, and alcohol is reformed from the recombination of hydrogen derived from the water. I propose the employment of these ethylates as caustics. I believe they will be found to be the most effective and manageable of all caustics; and that in cases of cancer, when it is desirable to destroy structure, without resorting to the knife, and in cases of nævus and other simple growths, they will be of essential service. The ethylates can be held in solution with alcohol in various degrees of strength; the solution can be applied with a glass brush or injected by the needle, and a slow or quick effect can be insured, according to the wish of the operator. The ethylate of potassium is the most active agent.

Triethylic Ether.—When the ethylate of sodium is acted upon by chloroform, there is produced an ether, called triethylic, of which there is here a specimen. The chemical action which takes place is very fierce, and great care is required to secure a fair product. In the decomposition the chlorine of the chloroform combines with the sodium of the ethylate to form chloride of sodium, which salt falls down, and triethylic ether remains. As chloroform contains three atoms of chlorine, each single part of chloroform decomposes three parts of ethylate of sodium. Thus:—$3(C_2H_5NaO)$, ethylate of sodium; $CHCl_3$, chloroform $= 3NaCl$, chloride of sodium, and $C_7H_{16}O_3$ tryethylic ether.

The ether is a heavy, aromatic, ethereal fluid, having a vapour density of 74, a specific gravity of ·896, and a boiling point of 145° C., 297° F. It acts much like alcohol physiologically, and I have lately used it as a menstruum of ethylic ether for general anæsthesia. The ethylic ether carries over with it, in evaporation, sufficient of the heavier ether to form a compound vapour which is very pleasant to breathe and equable in action. I have administered this compound twice for operations on the eye—once while Mr. Brudenell Carter operated for strabismus, and once while Mr. Walker, of Liverpool, operated for cataract. The anæsthesia in both cases was perfect. The ether also forms an excellent mixture with bichloride of methylene; and were mixtures of anæsthetic substances satisfactory scientific applications, we might bring it into extensive use. I accept it, however, rather as an index of the way I should go than of a resting-place. I look for a simple ether which shall have the full and safe qualities of the mixture, together with perfect stability. We have before us, in truth, already another ether, called trimethylic ether, made by acting on methylate of sodium, CH_3NaO, with chloroform; the product being 3(NaCl), common salt, and $C_4H_{10}O_3$ trimethylic ether. But this ether which has a vapour density of 53, and a high boiling point, is not quite, though it approaches, the substance we require.—*Medical Times and Gazette, Oct.* 22, 1870, *p.* 472.

116.—ON THE ACTION OF MERCURY.

By Dr. James Ross.

There can be no doubt that, during the administration of mercury, the blood undergoes many changes; but the question to be determined is, whether this is a primary or a secondary action. The repair of a slight external injury produces alteration in the blood; but in this case the change in the blood is secondary to the change in the tissues; and it is quite possible that the same may be the case with the blood changes produced by mercury. According to the theory of inflammation and of syphilis which I adopt, the principal part of the morbid process takes place in the tissues internal to the blood-vessels, and it is only consistent that I should endeavour to elaborate a theory of the action of mercury in the same direction. On the other hand, those who are satisfied with the zymotic theory of syphilis will be naturally inclined to believe that mercury produces its primary action upon the blood. Nor can I prove a negative against this theory, and therefore cannot positively say that it is erroneous. I will, however, claim this much for the theory I am about to advance, that it will explain more of the known effects of mercury, and that the practical maxims by which we are guided in its administration at the bed-side can be readily deduced from it.

I have already said that I would take it for granted that the salt of mercury is absorbed into the blood, and I conceive that after absorption it has an affinity for a certain tract of tissue. The tissues for which mercury has an affinity are generally the same as those attacked by syphilis, namely, the white tissues of the body. It seems to affect by preference the joint ends of the long bones, serous membranes, certain parts of the true skin, and probably the submucous tissue of the tonsils, fauces, and gums; and it appears to seek an outlet from the body mainly through the salivary glands and the mucous membrane of the alimentary canal, especially that of the rectum. The nature of the influence exerted by mercury over the tissues for which it has an affinity is that of a stimulant; but in order to prevent misconceptions I must dwell a little on the meaning which I attach to that term. Pereira defines a stimulant "as an agent which increases the vital activity of an organ." When, however, I say that mercury is a stimulant to the tissues for which it has an affinity, I do not mean to assert that the real effect which ensues is one of vital activity. The reverse of this is very often the case; but even when death of the tissue results the tendency of the drug may be that of a stimulant For the sake of illustration, let me imagine a person looking at a boy's kite falling to the ground, and suppose him ignorant of the special characteristics of this instrument, but knowing the general properties of matter. He will know that the kite is falling by the force of gravity, and may think that by pulling at the string attached he will accelerate its fall. If he makes a very slight pull, he will succeed; a little stronger pull, and he may still succeed; and this he may regard as a complete verification of his argumentation. But when the pull is still stronger, the kite makes a turn and begins to ascend. By gradually increasing the tension of the string he may get the kite to ascend more steadily and more rapidly, and he may now be ready to come to the conclusion that the more he pulls the more quickly will the kite ascend, when all at once the balance is overthrown and the kite descends again. Here then are the most opposite effects produced by only slight differences in degree of the same cause, namely, slight variations in the tension of the string attached to the kite. The explanation of this is that when we call the tension of the string the cause of the motion of the kite we employ the term in its popular and not in its scientific sense. In the scientific sense the cause is the aggregate of conditions or circumstances requisite to the effect. The scientific cause of the motion of the kite is not only the tension of the string, but the properties of the kite itself, with those of the earth and of the atmosphere which surrounds the kite.

In investigating, therefore, the cause of the effects attributed to mercury we ought to remember that the scientific cause is not the mercury only, but also the laws of the body with that of its environment. Hence it is that the most opposite effects may be explained by one and the same tendency of action of one of the factors of the cause. It now remains for me to show that the main effects of mercury on the body may be explained on the supposition that it tends to stimulate to increased activity the tissues which I have already specified. I shall now endeavour to apply this theory very briefly to the explanation of the phenomena. When mercury is administered in health it may, by stimulating in excess, produce local inflammations in the tissues for which it has an affinity. I cannot say why mercury acts upon the salivary glands, gums, fauces, and upon some parts of the alimentary canal; our best plan is to accept the facts and endeavour to utilise them in practice. These facts may at some future time be explained when the laws of the correlation of growth, or what Paget calls "complementary nutrition," are better ascertained. According, then, to my theory, the changes in the blood and the nervous symptoms result from anterior nutritive changes in the white tissues.

When mercury is administered in disease, say in the first stage of inflammation of a tissue for which it has an affinity, it may act in two ways; it may aggravate the disease, or it may develop the second stage; hence the caution which is generally laid down in books, that mercury should only be employed after depletion. Mercury, in short, is a hazardous remedy for the first stage of the disease, and should in general not be employed till the skin is moist and the pulse has lost its hardness. In the second step of inflammation of a tissue, for which mercury has an affinity, it stimulates it to increased action; more blood is attracted to the part; the circulation through it is rendered more active; absorption of effused fluids takes place, and the cells of the part rise in the order of organization; hence the entire course of events in this stage is towards health. Mercury is not a remedy for the generality of mucous membranes, just because it has no special affinity for them.

In syphilis, mercury is administered when the base of the primary ulcer is thickened. It acts by stimulating the tissues surrounding the ulcer to increased action. Great care, however, should be taken not to push the action of the drug too far during the period of the disease. It ought to be remembered that the syphilitic gemmules may already be circulating in the blood, and if these gemmules and the mercury impress their motion upon any tissues at the same time, the disease may be very much aggravated. I have already said that some of the tissues of the body may be undergoing the syphilitic movement without any external lesion being produced. But if the mercury begins to affect this tissue at that time, a severe lesion may be the result. This will explain why some medical men have attributed the syphilitic lesions to the mercury itself, since the drug has in this case acted as a concurring cause. The mercury should be administered, not before a lesion takes place, but during chronic thickenings and other lesions, in order to stimulate the tissues to increased activity, and only when the lesion takes place in a tissue for which the mercury has an affinity. The action of mercury therefore in syphilis is not at all comparable to the action of an alkali in neutralizing an acid, or to that of an antidote to a poison, but is more analogous to the action of a spur in riding a horse. Sometimes the spur may be useful, sometimes injurious; but the object is to get the horse to accomplish a journey. Similarly, mercury may be useful at times, may do a great deal of harm at other times; but, in determining under what circumstances it should be employed, it ought to be remembered that the aim of treatment is not to check or repress the disease, but to assist it through a revolution. To borrow an illustration from the life of states; the function of the medical man in the treatment of syphilis is not like that of the stern warrior, who suppresses a revolution by opposing force to force and compels order, but *to that of the* great and wise statesman, who directs the social forces into

a particular channel, and out of the discordant elements evokes the double events of order and progress.

Dr. Ringer, in his recent work on thereapeutics, recommends mercury in mumps, tonsillitis, and dysentery; and this is only what might be anticipated if my theory is the correct one. In the present divided state of opinion, I shall not undertake to decide whether or not it has a special action over the liver, but I will say that Dr. Bennett's experiments are not at all conclusive in the negative.—*Practitioner, Oct.* 1870, *p.* 218.

117.—THE MECHANICAL DIVISION OF MERCURY.

Mr. J. Calvin, of Texas, communicates the following process to the *Chicago Pharmacist*:—It is headed "Quick way of extinguishing mercury." He states that on shaking tincture of tolu with mercury (one fluid drachm of the tincture with three ounces of mercury) in a strong two-ounce vial, the whole of the mercury was reduced to a state of minute division, which is easily mixed with fatty or other ingredients.—*Med. Press and Circular, May* 25, 1870, *p.* 417.

118.—THE ANÆSTHETIC PROPERTIES OF CARBOLIC ACID IN SOME SKIN DISEASES.

By Erasmus Wilson, Esq., F.R.S., Professor of Dermatology in the Royal College of Surgeons, England.

[Mr. Wilson was consulted in 1868 by an officer, on account of great hypertrophy of the epithelium of the glans penis. The end of the penis was flat, and had the appearance of being spread out, and the whole of the flattened surface was covered with a horny, almost warty layer of epithelium.]

The history of the case was as follows:—The patient had been the subject of herpes præputallis, repeated, as is usual with that complaint, periodically; he was also, when these attacks took place, tormented with phymosis; and his surgeon, to remove the phymosis, performed the operation of circumcision. This happened in 1861, seven years previously to his coming under my care; and from the period of the operation up to the present time, irritation of the part had continued to prevail; the papillæ of the glans and inner surface of the stump of the prepuce had increased in size, and a thickening and condensation of the epithelium was the result. He had made many efforts to obtain a cure, and was almost in despair.

I proposed to him to remove the horny layer and obliterate the hypertrophous papillæ by means of a solution of equal parts of potassa fusa and water, and this I have succeeded in accomplishing almost completely. The application of the caustic was excessively painful, so that only a small portion of the growth could be operated on at a time; and at the end of a few days there was so much inflammation that it became imperative to desist for a week or more before resuming the use of the remedy. This circumstance, and the necessary pursuit of his military duties, have protracted the cure for nearly two years; but during that period he has been making sure, although slow, progress, and bit by bit the extent of the disease has been diminished.

In the course of the treatment I endeavoured to persuade him to apply the caustic himself, and supplied him with the material; but the attempt failed in consequence of the excruciating pain caused by its application. It was evident that some share of this extreme sensitiveness was due to the sensibility of the organ, and not a little to irritability induced by prolonged inflammation. This was our position one day recently: I had denuded the base of a large portion of the hypertrophous growth; but another application was necessary to reach the papillæ; and the patient's power of supporting further pain was exhausted. There were reasons why

chloroform could not be employed; local anæsthesia had, possibly from mismanagement, complicated the difficulty, and I was beginning to feel a little puzzled for the means of attaining my object, when it occurred to me to attempt to conquer the morbid irritability of the part by means of carbolic acid. It may be premised that in consequence of this dread of pain, I had left the application of the caustic to the patient himself, merely encouraging him to proceed, and pointing out the spots which he should principally attack; and when I suggested, after some minutes of agony, that he should touch the raw surface with carbolic acid, he shrunk from the proposal, having on several occasions used it before, and found it very painful. Nevertheless, the occasion was pressing, and he brushed the surface with carbolic acid, and was gratified by finding that he could do so without suffering. The carbolic acid exercised its usual effect of coagulating the albumen of the surface, and producing a white film; and after repeated applications the film had reached a considerable thickness. Now was the time for the renewal of the original caustic, and after some hesitation it was applied; but to the patient's astonishment and my own satisfaction with an almost painless result. The caustic which a few minutes before was utterly unendurable, could be used now, and with perfect freedom—almost with inconvenience. We followed up our discovery, and left very little of the surface for future operation.

This anæsthetic property of carbolic acid was not altogether new to me; but I had never before seen its power so strikingly manifested. I have used it often since, and always with the most satisfactory result; and I employ it at present, very commonly, previously to the application of caustic to lupus and epithelioma. It benumbs the surface, it dulls the excessive sensibility of the superficial nerves, and it thereby permits the caustic action of our remedies, with a great reduction in the amount of pain. It admits, I have no doubt, of more extensive application, and will, I have reason to believe, come into general use for a similar purpose. —*Journal of Cutaneous Medicine, June*, 1870, *p.* 5.

119.—EXPERIMENTAL INVESTIGATIONS INTO THE ACTION AND USES OF GELSEMIUM SEMPERVIRENS.

By Dr. Roberts Bartholow, A. M., Professor of Materia Medica and Therapeutics in the Medical College of Ohio, Cincinnati, U. S.

Gelsemium is included in the "Secondary List" of the U. S. Pharmacopœia. It was originally introduced into medical practice by the physicians of southern United States, but unfortunately, its mode of action and the character of cases to which it was applicable not being well understood, it did not come into general use. The so-called "Eclectics" adopted it into their Materia Medica, and much of the information in regard to its therapeutical effects now current was derived from them. Recently, however, the attention of the regular profession has become more fully awakened to the value of gelsemium as a remedial agent, and various articles setting forth its virtues have lately been published. Hitherto its physiological action has not been submitted to systematic examination. Very recently its chemical constitution has been accurately determined by Professor Wormley, of Columbus, Ohio. To ascertain whether the alkaloid he had isolated possessed the toxic activity of the plant, Dr. Wormley injected a solution of the chloride of gelsemia under the skin of a cat, and in this way observed some of the physiological effects; but he extended his researches no further in this direction.

Summary of Physiological Action.—1. Being a crystalloidal substance, gelsemiate of gelsemia, the active principle, is rapidly absorbed into the blood.

2. It has a selective action on the nervous system.

3. It acts chiefly on the motor portion of the cord.

4. Its paralysing effect is due to its action on the motor centre, and not to an action on the peripheral nerve-fibres.

5. It acts also on the sensory portion of the cord, producing at last complete anæsthesia; but this effect in warm-blooded animals and man is toxic only, and follows the paralysis of the motor functions.

Synergists.—All the paralysers are synergistic to gelsemium. In its physiological action, gelsemium corresponds more nearly to conium than to any other agent. Conium is a paralyser, but unlike gelsemium, the paralysis commences at the periphery, and rapidly extends to the motor centre. Conium, like gelsemium, does not destroy the muscular irritability. Gelsemium impairs the sensibility of the sensory nerves, which conium does not. Both cause death by asphyxia—paralysis of the muscles of respiration. In their effects on the brain these agents act similarly. Neither destroys, *per se*, the functions of the brain, consciousness being preserved until carbonic acid narcosis supervenes. Both produce dilatation of the pupil and blindness; but gelsemium more distinctly paralyses the third pair than conium.

Antagonists.—The subject of physiological antagonisms is one of great interest and importance. I have, accordingly, devoted much time and labour to a determination of the supposed antagonists to gelsemium. It will suffice to present here the conclusions to which I have arrived.

A priori, nothing would seem more complete than the opposition in physiological effects of gelsemium and *strychnia*, throughout the whole range of their action, except in the rate at which they move to affect the system. Repeated trials on warm-blooded animals—cats and pigeons—have convinced me that there is no antagonism. An animal under the influence of gelsemium is quickly tetanised by strychnia. The same observation has been made by Guttman, in regard to conia and strychnia. A toxic dose of strychnia proves fatal before the animal can be affected by gelsemium, if the two agents be administered simultaneously; hence it is necessary, in order to ascertain the existence of a supposed antagonism, to produce the full effects of gelsemium before administering strychnia.

As respect their physiological antagonism, there are many points of resemblance, and some points of difference, between *atropia* and gelsemium.

The dilation of the pupil produced by both is due, in the case of atropia, to contraction of the radiating fibres of the iris; in the case of gelsemium, to a paretic state of the circular fibres.

In their action on the heart these two agents are antagonistic—atropia increasing the cardiac movements, and gelsemium diminishing them.

As both cause paralysis of the muscles of respiration, it is obvious that one cannot be used against the toxic symptoms produced by the other. By experiment we ascertain that this observation is correct. Atropia hastens the paralysing action of gelsemium on the respiratory muscles, but maintains the action of the heart for some minutes after the total cessation of the respiratory movements—much longer, indeed, than the heart continues to beat after stoppage of respiraton, when gelsemium alone is used.

The opposite effects of gelsemium and *physostigma* on the pupil suggest an antagonism at other points in the range of their action. It is found on trial, however, that physostigma does not overcome he dilatation of the pupil caused by gelsemium, a result apparently due to the powerful action of the latter as a paralyser of the third pair. As respects toxic effects, physostigma is synergistic to gelsemium. In my experiments on warm-blooded animals, I ascertained that death resulted more speedily from a fatal dose of gelsemium when physostigma was also administered.—*Practitioner, Oct.* 1870, *p.* 200.

120.—THERAPEUTICAL PROPERTIES OF IODINE.

By Dr. W. Wh TELAW, Kirkintilloch, N.B.

In connexion with Dr. Sirton's practical paper on iodine, published in

your impression for September 3, I beg to refer your readers to a compendium of Dr Richardson's well-known article on iodine, printed in the Social Science Review for July, 1864. From that article backed with valuable information, here is one paragraph:—"Iodine may be used successfully for another purpose—viz., in cases where the breath is very fœtid. The metalloid may be placed in a common smelling-bottle, and may be occasionally inhaled to such an extent as not to produce soreness or dryness of the nostrils or throat. We have known it thus applied with great and immediate advantage, and have found it destroy almost at once the disagreeable odours arising from the eating of onions and from smoking tabacco. We have also recently used it, on the suggestion of Dr. Wynn Wi liams, as an application to fœtid and indolent ulcers and sores on the human body. In hospitals, at the instance of Mr. Hoffman, of Margate, it is now employed in the beds of the sick in some cases, as where there are extensive bed-sores. In these cases the chip-box is employed, the box containing the iodine, and covered with muslin, being placed under the bed-clothes. To this process there is one objection: the sheeting becomes tinged of a brownish colour. The discoloration is easily removed, however, by washing the sheets with a little soda—in a word, i. dine may be considered as the readiest and best of all disinfectants."

Various valuable papers on the therapeutic properties of iodine are scattered over the medical journals. In the Lancet for Aug. 6, 1864, there is mention of a case of erosive ulceration of the derma of the nose, cured Mr. Ure with the external application of iodine.

In your own journal has appeared a paper on the danger of iodine poisoning, of which the Medical Circular for Nov. 9, 1864, gave the following summary:—

"The subject was an Indian lad, aged 17, who had become a patient from mumps, the sequel to a billious remittent or Bombay fever. When the acute stage of inflammation of the parotids had passed away, the remaining enlargment was painted with a very strong solution of iodine, the tincture having been rendered much stronger by evaporation. Five hours after the using of the paint, vomiting and purging supervened, and on the day following there were present all the symptoms of iodism in their severest form. Death occurred in about thirty hours after the application of the iodine. A post-mortem was made, and the examination showed that the mucous membrane of the stomach was studded with small ecchymoses; that the small intestines presented similar ecchymoses. The left kidney was atrophied, weighing only an ounce. Bladder healthy, containing ʒ jss. of urine, in which were slight traces of iodine.

In my own practice, the internal use of small doses of iodine, with iodide of potassium, in bitter effusion, is a reliable remedy in cases of syphilis; and as a gargle for sore throat in the same cases, tincture of iodine and solution of chlorinated soda in water are of marked benefit.

The compound iodine ointment, rubbed into the shin-bones of syphilitics, banishes the usual nocturnal pain felt in the legs. The same ointment, four days after a fly blister, is very useful when applied in cases of chronic pleurisy.

In the dysmenorrhœa of corpulent women iodine inwardly is also useful. Taking a hint from the Med. Times and Gazette for July 10, 1869, I have used it successfully for periodontitis, as recommended by Professor Abbott, of New York, in the following way: R. Tinct. iodine and tinct. rad. aconite, equal quantities. Apply to gums with a brush once or twice a day, three drops at a time. Allow to dry on gums.

In combination with any anodyne liniment, iodine is a beneficial outward application in cases of chronic strumous peritonitis; and presently under my charge there is an obscure painful swelled knee case, in a young woman, that has been benefited by the external application of liniments of iodine, chloroform, and belladona, in combination. While I have cured two cases *of scrotal* hydrocele, one in a mason, and the other in a baker, with *iodine—the operation* being performed in late Mr. Syme's simple manner—

equal success has not followed its injection into the sinuous ulcers of strumous subjects; and in the treatment of ringworm, iodine has proved inferior to either strong acetic acid, sulphurous acid, or lotion of corrosive sublimate.—*Medical Times and Gazette, Oct.* 1, 1870, *p.* 891.

121.—A NEW IODINE PAINT.

By Dr. J. Waring-Curran, Sutton, Notts.

I have been requested by some professional *confrères* to bring under the notice of the profession, a new *iodine paint*, which I have had prepared and used with satisfaction and success, in the cases of glandular enlargements and scrofulous diseases, wherein iodine is called into requisition. In the hands of esteemed and eminent practical surgeons, it has proved equally beneficial as in my own practice, and they speak or write in flattering terms of it to me.

I rub down half-an-ounce of iodine and a like quantity of iodide of ammonium in a Wedgwood mortar, and gradually dissolve it in twenty ounces of rectified spirit; to this I add four ounces of glycerine, shaking the solution well together. A very nice paint is thus obtained, which has the following advantages:

1. The iodine is prevented escaping owing to the combination, which, in the form of ordinary tincture, in warm weather it is very apt to do.

2. It preserves the iodide of ammonium instead of the iodide of potassium; the former being a more powerful absorbent than the latter, which recent investigation has verified.

3. The action of the glycerine is soothing to the skin, keeping it soft and pliable, a contrast to the shrivelling of cuticle produced by the ordinary tincture in common use, which frequently acts as a vesicant. But where absorption is desired, the part affected and its neighbourhood influenced, as well as the system generally, by iodine, and no local irritation required, this combination in form of paint will be found superior to the old tincture.

Some time ago, in the columns of the Medical Press, I gave a history of very extensive bronchocles met with in the Valley of Rosendale, which were reduced by the iodide of ammonium, exhibited internally, as well as locally applied in form of citrate. Since then I have seen parallel cases in Derbyshire, which were much benefited also by the combination of iodide of ammonium, and glycerine, to which I now direct attention.

I have not confined the use of the preparation alone to glandular swellings or scrofulous gatherings. I have employed it in chronic cutaneous diseases, to nodes, over enlarged livers, diseased joints, to hypertrophied parts or morbid growths, and in cases wherein it was necessery to alter an abnormal action or promote absorption, and the result was uniformly satisfactory, and I think I may safely say, the effect of the iodine was more readily appreciable, and more quickly demonstrated in its action on the system generally, as well as by its absorbent properties locally, than the old tincture of the British Pharmacopœia, *minus* its disadvantages.—*Medical Press and Circular, Aug.* 3, 1870, *p.* 93.

122.—ON ATROPIA AND ITS PHYSIOLOGICAL ANTAGONISTS.

By Dr. Roberts Bartholow, A.M., Professor of Materia Medica and Therapeutics in the Medical College of Ohio, Cincinnati, U. S.

[The following paper was elicited by one upon the same subject by Dr. Fraser, and consists of extracts from an Essay by Dr. Bartholow, to which was awarded one of the National Medical Association's Annual Prizes for 1669.]

*Atropia and Physostigmia.**—The opposite effects of atropia and phys-

* The Physostigmia (calabarine) employed in these researches was made by Merck, of Darmstadt, who enjoys a deservedly high reputation on the continent of Europe for his pharmaceutical preparations.

ostigmia on the pupil are so striking, that a physiological antagonism, extending throughout the whole range of their action would seem to be probable. The dilatation of the pupil as produced by atropia is due, as shown in the preceding pages, to contraction of the radiating fibres of the iris. As the circular fibres of the iris are innervated by the third pair, the contraction of the pupil produced by physostigmia must be due either to paralysis of the sympathetic or to excitation of the sphincter muscle. These two agents must, therefore, act oppositely upon the sympathetic system, or one must act upon the sympathetic and the other upon the nervous system of animal life.

Dr. Fraser, of Edinburgh, has published an admirable paper upon the physiological effects of the extract of Calabar bean. I shall avail myself of his very exhaustive labours, assuming that what he has informed us of the action of Calabar bean is entirely correct. I take this position the more readily, because my own observations with this agent are entirely in accord with Dr. Fraser's. In order to a more ready comprehension of the reactions which ensue when these two agents are conjointly administered, I place in parallel columns the principal physiological effects of each:—

ATROPIA.	PHYSOSTIGMIA.
A spinal paralyser.	A spinal paralyser.
Destroys excitability of motor nerves.	Destoys excitability of motor nerves.
Destroys muscular irritability.	Preserves the muscular irritability.
Destroys the excitability of the sensory nerves.	Increases rather than diminishes the excitability of the sensory nerves.
Increases the action of the heart and the arterial tension, by an excitation of the sympathetic. Increases action of heart after division of pneumogastric.	A large dose produces cardiac syncope; action of heart ceases in diastole. This effect is not produced through the pneumogastric, although this nerve is ultimately paralysed, for it follows when the pneumogastric is divided, nor does it result from paralysis of respiration. The cardiac syncope is due to a direct action on the cardiac ganglia.
	Diminishes arterial tension
Increases respiratory movements.	Paralyses muscles of respiration.
Dilates the pupil.	Contracts the pupil.

We have now the data for estimating the influence which these agents exert upon each other, when administered together.

Experiment.—Injected under skin of a frog 20 minims of a solution containing $\frac{1}{48}$ of a grain of physostigmia and $\frac{1}{24}$ of a grain of atropia. In fifteen minutes there was complete paralysis of the hind extremities, and partial paralysis of arms. Sensation was not abolished, for when the skin was pricked, or muscles pinched, the frog attempted to escape. Soon after, however, on pinching an extremity the limbs were agitated by violent tetanic spasms, especially the upper. A slight tap on the back produced these effects; closure of eyelids, a sharp cry, opisthotones, and tetanic rigidity of the limbs. Meanwhile the frog lay completely relaxed without the least motion. When taken by the head and raised up, the limbs hung down perfectly flaccid. A quick sudden blow, however, induced the tremors and the tetanic shocks. He lay in this condition a half hour apparently dead, when I inserted under the skin of the thigh $\frac{1}{4}$ of a grain of the sulphate of atropia. Returning to the room after an absence of two hours. I found that all the toxic symptoms had disappeared; the frog jumped and was as active and lively in every respect as before the experiment commenced.

Experiment.—Injected as before under the skin of a frog $\frac{1}{16}$ of a grain of physostigmia. Paralysing effects were manifest in thre hours. Then injected $\frac{1}{12}$ of a grian of atropia (sulphate). Soon after the atropia was admistered, the frog, when struck a quick, slight blow, uttered a cry, and was agitated by sudden tonic contractions of all the muscles. Slow and gradual pressure with the fingers did not produce these tetanic convulsions; but a quick tap on any part of the body gave rise to them. Then injected an additioual $\frac{1}{12}$ of a grain of sulphate of atropia. A succeession of tremors soon after agitated all of the muscles, especially those of the thigh, the limbs and body being all the time perfectly limp and flaccid. When the tremors ceased, no tetanic spasms could be induced by a blow

upon any part of the body. The frog then became entirely insensible to irritants, and appeared to be without life. On opening the chest, however, the heart was found to be pulsating strongly and equably 32 per minute.

Experiment.—To a cat administered $\frac{1}{8}$ of a grain of sulphate of atropia by subcutaneous injection. The usual toxic effects manifested themselves in a few minutes; dryness of mouth; redness and injection of the fauces; dilatation of pupils; partial paralysis of hind extremities; sensibility to touch, to pain, and especially to temperature diminished; reflex movements normal. Injected then $\frac{1}{8}$ of a grain of calabarine. In five minutes decided contraction of the pupil occurred; paralysis of all the muscles of animal life took place, so that the cat hung perfectly limp and flaccid when suspended by the ears; occasional tremors, especially of the limbs, and slight tetanic spasms on irritation of surface occurred, notwithstanding the complete paralysis; respirations grew slower and slower, and after the lapse of three hours occurred only at the rate of one in five minutes; action of the heart continued, but gradually lost power and diminished in frequency of pulsations; complete anæsthesia of cornea; reflex and accommodative movements of the eye finally abolished. Respiration ceased before action of heart.

In subsequent experiments I varied the proportion of atropia and calabarine (physostigmia) in order to ascertain how far these agents were antagonistic as to toxic power. Thus to a large and powerful cat I administered by hypodermic injection $\frac{1}{2}$ of a grain of sulphate of atropia, and $\frac{1}{24}$ of a grain of physostigmia. The symptoms of atropia poisoning were first manifested, and afterward the effects characteristic of physostigmia, without, however producing a fatal result. In corresponding doses physostigmia is more powerful than atropia; hence in order to obtain a balance of physiological effects, sufficient atropia must be administered to produce some dilatation of the pupil, and as physostigmia is slower and longer in action, the effect of the atropia must be maintained by continued use. If a quantity of physostigmia just sufficient to produce a fatal result, be administered, its toxic power may be counterbalanced by atropia given so as to maintain a slight degree of dilatation of the pupil. Large quantities of both these agents, administered simultaneously, so overpower the nervous centres (the cerebrum and respiratory centre) as to destroy life.

The results then of the study of the mutual reactions which obtain between atropia and physostigmia when administered together, may be stated as follow:—

Atropia and physostigmia are not antagonistic as regards their action upon the muscular system of animal life—paralysis being induced by both. Atropia produces paralysis by destroying the muscular irritability and the excitability of the motor nerves; physostigmia by paralysing the spinal cord.

Atropia and physostigmia are antagonistic as regards their action on the sensory nerves; atropia destroying and physostigmia heightening the sensibility of these nerves.

They are antagonistic as to their influence over the respiratory movements; atropia increasing and physostigmia retarding them.

They are antagonistic in their action upon the heart; atropia producing excitation of the cardiac ganglia, and physostigmia paralysing these ganglia.

They are opposed in respect to their action on the sympathetic; atropia producing increased action of the sympathetic; physostigmia paralysing this system.

They have opposite effects on the pupil in virtue of opposite effects on the sympathetic; atropia dilating the pupil by its action on the radiating fibres of the iris; physostigmia contracting the pupil by paralysing the radiating fibres.

A very singular effect, which I was not prepared to find, is the peculiar exaltation of the reflex faculty produced in frogs, when these agents are administered together—a sudden irritation of the surface causing tetanic

rigidity like electric shocks, the muscles immediately afterward resuming their very relaxed and flaccid condition. Atropia sensibly weakens, although it does not abolish entirely, the reflex faculty; physostigmia destroys the reflex faculty; yet the combination of the two agents produces effects not unlike those of strychnia. The analogy is preserved even after death, for post-mortem rigidity sets in at once and is very decided. The tetanic spasms must not be confounded with the tremors which are characteristic of physostigmia. These tetanic spasms are less marked in warm-blooded animals, but they nevertheless occur to a limited extent, and after death a marked degree of rigidity exists, the head and neck being curved back and the feet turned in.

Dr. Fraser also alludes to the reputed antagonism between atropia and prussic acid. As I have, in the essay referred to, examined this question, it may be worth while to submit my remarks upon this topic.

Atropia and Prussic Acid.—It has recently been asserted by M. Preyer that atropia is the physiological antidote to prussic acid. He was conducted to this conclusion by reflecting upon the mode in which prussic acid produces death. As prussic acid in large doses causes paralysis of the heart, he assumed that an agent which would paralyse the pneumogastric, the inhibitor nerve of the heart, and at the same time stimulate the central nervous apparatus of respiration, would prove to be the true physiological antidote. He, however, prudently restricts the use of atropia to those rare cases of poisoning by prussic acid, in which "there is apnœa and the heart remains beating."

There are various theoretical considerations opposed to this view. Piotronosky affirms that he has produced tetanic spasms of the heart and wrinkling in the transverse folds of its external fibres, by direct irritation of the vagus. This experiment is submitted in proof of the statement that the external fibres of the heart are innervated by the vagus and the internal by the sympathetic. If this be the case, it is obvious that an agent which simply paralyses the terminal filaments of the pneumogastric, would not supply the effect required. Moreover, division of the pneumogastric produces decided slowness of respiration, after having for a short period quickened it somewhat. Further, atropia has but little influence over the respiratory movements. Its real power consists in excitation of the cardiac ganglia of the sympathetic, and whatever of physiological antagonism there is between atropia and prussic acid must be referred to the difference in their action upon the heart.

Theoretical considerations must yield to the demonstrations of experiment. M. Preyer has demonstrated on rabbits and guinea-pigs, that the subcutaneous injection of small quantities of atropia is an unfailing antidote to prussic acid if employed quickly after the injection of the acid. I have submitted this statement to the test of experiment.

Experiment.—I passed into the throat of a pigeon, by means of a pipette, 5 minims of medicinal prussic acid (U.S.P.,) and immediately injected $\frac{1}{24}$ of a grain of sulphate of atropia. The bird had in a few minutes convulsive movements of the head, neck, and eyelids; fell down, and expired in a general convulsion of a tonic character.

The fatal result in the preceding experiment may be attributed to the atropia. In order to obviate this objection, I changed the order of administration of these agents. As pigeons are not very susceptible to the action of atropia, I also increased the quantity administered by subcutaneous injection.

Experiment.—Administered to a pigeon by subcutaneous injection one-eighth of a grain of atropia. When the influence of this began to be manifest, passed into the gullet by a pipette 5 minims of the medicinal hydrocyanic acid. Death ensued precisely as in the first case.

It may be urged against these experiments that pigeons are not suitable subjects. As cats are readily affected by both these agents, in my subsequent experiments I employed these animals. The details of the experiments and the results being so uniform, I need narrate but one as a *type* of all.

Experiment.—Administered by subcutaneous injection to a cat one-fourth of a grain of atropia. When the symptoms characteristic of atropia poisoning were produced, I poured into the gullet 10 minims of a medicinal hydrocyanic acid. The cat fell upon her side, had a few convulsive twitches of the extremities, uttered a sharp cry and expired.

In these experiments on cats I preferred to bring them under the influence of atropia before administering the prussic acid, because of the great difference in the rapidity with which these agents act. If there really existed a true physiological antagonism between them, there could be no difference in result whether atropia or prussic acid were first administered. It is clear, I think, that no such antagonism exists as supposed by M. Preyer, but it may be admitted that atropia will be useful in counteracting the depression of the heart's action in those rather exceptional cases in which the symptoms of poisoning are delayed, or in those cases in which just sufficient prussic acid has been administered to produce dangerous symptoms, there being time enough to employ cardiac stimulants.—*Practitioner, July* 1870, *p.* 27.

123.—SUCCEDANEUM OF QUININE.

M. Pavia, an Italian professor of chemistry, has isolated, from the leaves and roots of boxwood, an alkaloid which he calls bussine. This substance has been tried in the treatment of marsh fever by several physicians in Italy, and with success at the rate of 75 per cent., quinine generally yielding 80 per cent. of cures. It should be mentioned that, in several cases, gastric uneasiness, pyrosis, thirst, sickness, giddiness, and tinnitus aurium were complained of.—*Lancet, May* 28, 1870, *p.* 769.

124.—CHLORATE OF POTASS IN CHRONIC ULCER.

By Erasmus Wilson, Esq., F.R.S., Professor of Dermatology in the Royal College of Surgeons, England.

[In the year 1866, a man, aged forty-nine, consulted Mr. Wilson on account of some ulcers on the leg, which had been in existence for two years. They were six or eight in number, and the intervening skin was red and irritable from the presence of edzema squamosum. Mr. Wilson came to the conclusion that the hidden cause of the disease was syphilis, although this conclusion was arrived at more by negative than positive evidence. Five grain doses of iodide of potassium, with a drachm of fluid extract of sarsaparilla, twice in the day, were prescribed, and this treatment afforded great relief, without absolute cure, the disease returning again and again.]

In 1868, he returned to me early in the year with the sores still unhealed; he thought the ointment irritated the skin, and I substituted camphor for carbolic acid in the zinc ointment, and prescribed for him five grains of citrate of iron and quinine, twice daily. But in April I again felt the necessity of resorting to the iodide of potassium. In September he pointed out to me four tubercles, apparently syphilomata, situated around the ankle; and as I was growing discontented with the powerlessness of the iodide, I gave him the perchloride of mercury with bark. But the perchloride seemed to have as little permanent influence as the previous remedy; and in November I again fell back upon a graduated course of the iodide of potassium.

It was observable that the longest intervals of benefit always followed the graduated course of iodide of potassium; that for a while it could be depended upon, but that sooner or later all the old symptoms returned. Thus at his last visit in November I put him under a course of iodide of potassium, and he found no necessity for returning to me until August, 1869. He then informed me that the ulcers had healed over under the iodine course, and had remained healed for several months; but that they had now broken out afresh. And in this instance, as he had been taking

the iodide so recently, I had recourse to the solution of the perchloride of mercury with cinchona.

I had now to consider my patient's case one of some difficulty and no ordinary obstinacy; and, therefore, when he presented himself to me some two months later, in no degree improved, but rather worse than usual, I determined to vary my method of treatment and try the effect of the chlorate of potass, instead of the iodide of potassium. I had previously found the chlorate of potass valuable in other obstinate cases originating in syphilitic cachexia, and I had employed it also in cancerous cachexia with benefit; and the case before us seemed well adapted to test its capabilities. In the early part of November, 1869, therefore, I prescribed ten grains of the chlorate of potass twice daily; with the application to the ulcers, once in the day, of a solution of chlorate of potass in glycerine, of the strength of one drachm to the ounce. Four months later, namely, on the last day of February, 1870, he again paid me a visit; this time, evidently, very much improved in health, and in good spirits: the leg, he said, was sound, and he felt better than he had ever done before. He stated that the local action of the chlorate of potass was very remarkable; he could see a change for the better every time he used it; that the foul appearance of the sore rapidly vanished, and that it filled up with firm granulations. At one time, he said, he had nine ulcers upon the leg, the largest about an inch in diameter, and all circular in figure, but they were now completely healed, and more solidly than had been the case before. After five years of experience in this troublesome malady the opinion of the patient was not without its value; and he stated that the last treatment had produced a more decidedly favourable effect both on the sores and on his health in general, than any other he had undergone.—*Journal of Cutaneous Medicine, June*, 1870, *p.* 9.

125.—ON THE THERAPEUTICAL EMPLOYMENT OF LACTATE OF IRON.

By JAMES C. DICKINSON, Esq., late Bengal Medical Service.

[Lactate of iron has, for the last five years, been extensively prescribed as a tonic both by civil and military surgeons in the Bengal Presidency.]

Lactate of iron was first largely prescribed by me in those extreme cases of debility and anæmia, the sequelæ of the most severe form of malarious fever I ever witnessed in India—the Bhootan fever—presenting, in my opinion, all the depressant characteristics in an intense degree of the Assam fever—a fever which had hitherto been looked upon by Indian practitioners as the most deadly form of fever—the Peshawur even not excepted. The condition of the invalids sent down from Bhootan was as follows:—Extreme prostration, with great tendency to relapse after the slightest exertion or exposure to the sun; enlargement of the spleen in many cases; anæmia; loss of appetite; great depression and giddiness. The emaciation and peculiar sand-like colour of the skin were so remarkable, that among a crowd of invalids you could at once, without hesitation, pick out with perfect certainty the "Bhootan-wallahs" as they were named by the other soldiers. In these cases I prescribed a teaspoonful of the syrup (the form in which I always prescribe it), in water, three times a day. After the medicine had been taken for about ten days, I generally noticed a very marked improvement in the general appearance; depression and sense of being easily fatigued had disappeared, the appetite in the majority of cases was completely restored; and so steadily and rapidly did many of them improve that in about twenty days from their first taking the lactate a patient was enabled to proceed on board ship, without assistance, and look forward to the voyage home with comparative pleasure. Another class of cases which have benefitted by the lactate of iron are female complaints, especially anæmia, chloro-anæmia, leucorrhœa, and passive hemorrhages generally. The two former classes of cases have led me to regard the lactate of iron as a very valuable remedy in female complaints, *especially* in those forms which depend upon debility.

In anæmia, the first favorable symptom I noticed in patients after taking the lactate was a marked increase in the appetite; this was soon followed by their feeling stronger; they could walk up and down stairs more easily, the palpitation and puffing, the giddiness and headache, insensibly diminished, the healthy complexion was soon recovered, and all functional disturbance was removed.

In leucorrhœa, I mean that form so commonly noticed among European females in India soon after parturition, I seldom had much difficulty in curing them of this distressing local discharge; as when the beneficial effects of the lactate of iron became evident, a simple astringent injection completed the cure. In functional palpitation of the heart dependent upon debility, and in certain forms of dyspepsia, I have prescribed this medicine with advantage.

In hypertrophy of the spleen—a disease of very common occurrence in all parts of India—I have latterly always prescribed the lactate in preference to any other preparation of iron as soon as the enlargement of the gland was reduced to its normal size by the exhibition of bindaal (Luffa echenata, Nat. ord. Cucurbitaceæ).

The syrup is well adapted for administration to young children, as the taste is not unpleasant. In general atrophy—not uncommon in European children born in India, due to the carelessness of native servants in allowing children to eat whatever and whenever they like, and not unfrequently to the practice of engaging native wet-nurses, who suckle their own children as well as the European—I have prescribed this medicine, in combination with cod-liver oil, with the best results.

For boils, which are so common in India, and which present so many varieties, and frequently prevail epidemically, I have found this preparation of decided benefit; it fortifies the system against the debility that boils induce, and thereby, in my opinion, arrests the tendency they so frequently have to recur—*e.g.*, the Delhi boil. In females in India, and I may add in England, who are subject to successive crops or periodical attacks of boils, where the cause is traceable to some kind or other of menstrual irregularity or mal-assimilation of food, I know of no medicine better calculated to satisfy the hopes of the medical practitioner than lactate of iron.

As a prophylactic against malarious fevers, I have found lactate of iron of great service, due no doubt to its hæmatinic properties; while in some cases, where from idiosyncrasy quinine cannot be borne by the stomach, I have found the lactate a useful substitute. The lactate cannot, however, occupy the position as a prophylactic for Indian fevers that quinine does; it must only be regarded as ancillary to it."

The above *résumé* of cases in which I have employed the lactate of iron leads me to think that this medicine deserves a trial. It possesses all the properties of the other preparations of iron; as a blood-restorer it is a very effectual remedy; it does not produce constipation, is almost devoid of any disagreeable taste, and in most cases rapidly restores the appetite. As it possesses scarcely any astringency, it may be given when the stomach will not bear the more styptic preparations of iron.

Messrs. T. Bell & Co., of Oxford-street, have on several occasions prepared for me the syrup, and it possesses all the properties I have ascribed to the lactate in this paper.

The dose for an adult is a teaspoonful, gradually increased to two, taken either in water or soda-water; and for children half a teaspoonful twice a day, and gradually increased according to age.—*Lancet, Aug.* 20, 1870, *p.* 248.

126.—ON THE CHEMICAL NATURE OF WHEY AND MILK.

By Hermann Lebert, Professor of Clinical Medicine in the University of Breslau.

If we compare different kinds of milk with reference to their solid constituents we find that asses' milk is most dilute, containing scarcely 9 per cent. solid matter; next stands human milk with somewhat over 11 per cent.; next stands goats' milk with 13½ per cent.; next cows' milk with over 14 per cent.; then sheep's milk containing 16 per cent. (according to

an analysis recently made in my laboratory even 18 per cent.); and, lastly, mares' milk containing 17 per cent. From these facts asses' milk would be applicable in cases where a dilute milk seems desirable. Goats' and cows' milk represent the average quality; sheep's milk would be suitable when that containing a large amount of nourishment is thought necessary, and it is preferable to the rich mares' milk—which in the central parts of Europe is also frequently applied to therapeutic purposes—because it contains a larger quantity of albumen and casein.

Still more important than the total amount of the solid matter is the amount of casein and albumen. Excepting mares' milk, which is excessively poor in this respect, human milk is the poorest, containing only 4 per cent. of casein, whilst cows' milk contains nearly 5 per cent., and more than ½ per cent. albumen. In direct opposition to the latter stands asses' milk, with only 2 per cent. casein and albumen, and for this reason it is beneficially employed in inflammatory chronic diseases, in which the supply of nitrogenous matter must be confined within moderate limits. Goats' milk, with 5¾ per cent. of casein and albumen, is particularly characterized by its large amount of albumen, which is 1½ per cent., and sheep's milk is in this particular again the richest, since of 5½ per cent. of casein and albumen, as much as 1¾ are albumen.

Asses' milk contains also the smallest quantity of butter, whilst cows' and human milk contain 4½ per cent., sheep's milk nearly 6 per cent., and goats' milk nearly 7 per cent. Goats' and sheep's milk contain, again, the largest amount of hydrocarbons, and the sheep exhibits the enormous value of the nourishing constituents of its milk by its containing 11½ per cent. of proteine matters and hydrocarbons.

The milk sugar amounts on the average to 4 per cent. in the cow, goat, and sheep, and to more than 5 per cent. in the ass.

The salts, chlorides of the alkalies, earths, &c., amount to ¼ or ⅝ per cent. on the average on different kinds of milk. The large amount of milk-sugar in mares' milk—viz., 8 per cent.—only moderately increases its nutritive value, but renders it prone to alcoholic fermentation, whence arises its manifold application in courses of "Koumyss" treatment amongst Tartaric tribes.—*Medical Times and Gazette, Aug.* 13, 1870, *p.* 173.

127.—NEW PRESERVING FLUID FOR PREPARATIONS.

M. Mehu, Pharmacien of the Necker Hospital, states that for the last two years he has been experimenting with various antiputrescible fluids for the preservation of anatomical specimens, and has at length discovered one which answers excellently. This liquid only contains a small proportion of alcohol, and hence does not cause any considerable contraction of soft textures, which with him have chiefly been portions of the mucous membrane of the bladder, prostrate, &c. It contains arsenious acid, which preserves them from decomposition, and the development of cryptogamic vegetation is prevented by the addition of a small quantity of crystalised carbolic acid. The formula is—Arsenious acid, 20 parts; crystallised carbolic acid, 10 parts; alcohol, 300 parts; distilled water, 700 parts. The preparation of this fluid has led him to notice the great solubility of arsenious acid in alcohol, which has not hitherto attracted attention.—*Lancet, June* 18, 1870, *p.* 884.

128.—SYPHILIS.

We have found very few cases of secondary syphilis that have not yielded in a very satisfactory way to a combination of ¼th of a grain of perchloride of mercury, 5 to 15 grains of iodide of potassium, and a scruple of chlorate of potash, taken three times a day in some bitter infusion, such as gentian or quassia. The addition of the chlorate of potash appears to us to do more than merely prevent salivation. From a number of experiments with it, we are convinced that it increases the efficacy of the mercury, so that a small dose produces a more decided effect when taken along with it. —*Journal of Cutaneous Medicine, June,* 1870, *p.* 61.

SYNOPSIS,

(ARRANGED ALPHABETICALLY), CONTAINING

A SHORT ABSTRACT OF THE MOST PRACTICAL ARTICLES IN THIS VOLUME, SHOWING AT A GLANCE, THE MOST IMPORTANT INDICATIONS OF TREATMENT PUBLISHED BY DIFFERENT WRITERS WITHIN THE HALF-YEAR.

AFFECTIONS OF THE SYSTEM GENERALLY.

ACUTE RHEUMATISM AND GOUT.—In cases of acute rheumatism and gout it is of the greatest importance to keep the inflamed joints at absolute rest, to shield them from external pressure, and to give them ease. In rheumatism no other treatment is necessary; but in gout, the combination of iodide of potassium with iron to eliminate the poison, and at the same time to supply what is necessary for the growth of the red corpuscles of the blood, is advisable. It is well ascertained that acute gout causes a deficiency of the red corpuscles of the blood. The tartrate of iron is the best salt for combination with the iodide. (Dr. F. Sibson, Lancet, Aug. 13, p. 219.)

AGUE.—*Bromide of Potassium.*—Bromide of potassium, which was first introduced into practice as a remedy for enlarged spleen, has a great power over ague. In one case, illustrative of its action, the patient had had tertian ague for two months before admission to the hospital, and had taken quinine without benefit; after admission he took 84 grains more without benefit. Twenty-grain doses of bromide, three times a day, were then given, and he was discharged cured in ten days. It is found always to check the ague, and often to cure it permanently, not always, but that is the case with any remedy. (Dr. Moxon, p. 33.)

Substitute for Quinine in Ague.—The leaves and roots of boxwood contain an alkaloid called by M. Pavia, who has isolated it, bussine. It is found to be a good substitute for quinine in the treatment of ague. (M. Pavia, p. 394.)

CONTAGIOUS DISEASES.—*Propagation by Milk.*—Milk has a peculiar power of absorbing smells. If a bowl of milk is placed near recent asphalting, it will be found to taste and smell of the asphalte. It is found that milk will absorb a variety of offensive odours, such as those from assafœtida, fæces, and urine. This power of absorption resides principally in the cream. It has not been positively proved, but it seems not unlikely, that it may in like manner absorb contagious matters, and so be a means of propagating such diseases as typhoid and scarlet fevers. (Mr. L. Tait, p. 34.)

CONTINUED FEVER.—*Bromide of Ammonium.*—Bromide of ammonium and potassium are of great use in cases of continued fever complicated with sleeplessness, convulsions, and other cerebro-spinal symptoms. The dose given is fifteen or twenty grains at bedtime, or oftener if necessary. (Dr. W. Moore, p. 31.)

FEVER.—*Origin and Mode of Propagation.*—A medical practitioner, at Eichstadt, in Germany, has published an account of the sanitary condition of that district, which seems to prove that impure drinking water is never the cause of enteric fever. There are no streams, and only a few wells, and these in private possession. The wells only contain a few feet of water from surface drainage. Water is only obtainable by collecting the rain-water in cisterns by means of gutters. In these cisterns it becomes quite alive with organic matter. The living matters are quite visible to the naked eye. The cattle drink water almost black from admixture with drainage from manure heaps; and yet there has not been a case of fever in this district within the memory of the writer, nor have the cattle died from any epidemic disorder. The land lies very high, and geologically consists of porous limestone. (Dr. Buxbaum, Prof. Pettenkofer, p. 25.)

SCARLATINA.—The great use of ammonia in the treatment of scarlatina is acknowledged. This success does not arise from any fluidifying action of the ammonia upon the blood, but simply from its stimulating properties. A far better stimulant than ammonia is champagne. Professor Williamson, of Owens College Manchester, acting upon this idea, has for some years treated all his cases of scarlatina with champagne, and that from the very commencement of the disease. The moment he has been certain that the case was one of scarlatina, he has given the champagne regularly and freely. The more severe the febrile symptoms, being convinced that they arose from an atonic rather than an opposite state, the more bold has been his administration of the stimulant. He states that the success of this treatment has been almost uniform, the rash having always well come out, and not one single example of malignant sore throat having occurred in his practice. In a case which threatened to be bad and typhoid in character, as much as one full sized bottle of champagne was given every twenty-four hours, for the first four days. The result was that the sordes disappeared, and the malignant character of the throat affection passed off completely. No signs of intoxication or excitement appeared. (Prof. W. C. Williamson, p. 28.)

The following plan of treatment has been pursued with much success. On first seeing the patient, a powder, with five grains of calomel, and ten of mercury and chalk is given, and a tablespoonful of castor oil on the following morning, so as to thoroughly unload the bowels. A dose of castor oil every other night should be given for the same purpose, and it will bring away putrescent and offensive evacuations. Strong doses of the aromatic spirit of ammonia, varying according to the age of the patient, should be given every hour. No other food than undiluted sweetened milk should be given from the commencement of the disease, and it will be found that the patients do well upon this unstimulating diet, and that the little ones take it readily. If the cervical glands suppurate they should not be lanced, for if so, the discharge continues for a long time, exhausting the patient. (Dr. R. Sweeting, p. 29.)

SUNSTROKE.—There is one thing common to all cases of sunstroke, namely, a cessation of the perspiration of the skin for some days previously, and amongst all the diversity of symptoms during the attack there is one symptom common to all, extremely high temperature, higher indeed than is found in any other disease. The rise of temperature is probably the effect of the arrest of perspiration. The treatment must in the first place be directed to reduce the excessive temperature, for which purpose the cold douche is the most effectual means. The patient may be stripped, and cold water poured from a height of three or four feet. Ice to the head is a valuable remedy. As, however, depression of the vital powers forms a serious element in the disease, care must be exercised that the cold applications are only carried to the extent indicated by the condition of the patient. If he is in a state of collapse when first seen, they would be obviously improper, and the use of diffusible stimuli should be preferred. Venesection is always found to hasten a fatal termination. The order of treatment generally required is, cold douche first and stimulants afterwards, followed by a purgative-enema and sinapisms to the extremities. (Dr. Van de Warker, p. 36.)

AFFECTIONS OF THE NERVOUS SYSTEM.

CHOREA.—A great deal of the influence set down to electricity, ice-bags, iron, arsenic, quinine, and other medicines, has been imaginary. The really curative agents, in most of the cases published as illustrative of these plans of treatment, have been change from a crowded dwelling-house to a well-ventilated hospital ward, to good food, and quiet. (Dr. J. R. Reynolds, p. 57.)

Chloral—Chloral, judging from a case related, is not of much use in chorea when given in one large dose a-day. In this case it was found that by giving eight grains every four hours throughout the day and night, the symptoms rapidly abated, and in nine days all choreal movements had entirely ceased. (Dr. W. Strange, p. 97.)

DELIRIUM TREMENS.—*Chloral.*—Thirty grains of chloral were given to a patient suffering from delirium tremens. He went to sleep immediately after and slept for three hours, and after being awake for an hour the dose was re-

peated, with the result of sending him to sleep immediately. Next morning the patient was perfectly rational. (Dr. J. R. Reynolds p. 83.)

Tincture of Digitalis (half-ounce doses).—Five cases of delirium tremens treated by half-ounce doses of tincture of digitalis are reported, and we must confess that the results of the treatment surprise us. In the first case, after opiates had completely failed, and a fatal termination appeared imminent, the administration of the digitalis was followed by sleep in twenty minutes. The sleep lasted several hours, and on her awaking two drachms more of the tincture were given. After this no further treatment was required. In the second case, sleep came on in ten minutes after the exhibition of the remedy; in the third in less than twenty minutes; in the fourth in a quarter of an hour; and in the fifth within twenty minutes. In all, the first effect of the remedy was reduction in the frequency of the pulse, with an increase in its volume. In all opium had been previously tried without any benefit. All the patients were comparatively young. (Dr. A. Wiltshire, p. 85.)

ELECTRICITY.—*Effect of Electricity on Muscles.*—Electricity may be made to do either of two things, namely, reduce the contractile power of an over-acting muscle, or increase the contractile power of a feebly-acting or paralysed one. To do the former, pass a continuous galvanic current through the muscle, downwards along the course of the limb. This current must not be sufficiently strong to cause pain. The same thing may be accomplished by weak faradisation rapidly interrupted—more rapidly than in most electro-magnetic machines. To do the latter, it is only necessary to use the interrupted current. Supposing the case is one of wry-neck, it may be treated by applying the galvanic current to the contracted muscle to reduce its contractility, or the interrupted current to the opposite muscle to increase its contractility, so as to overcome the contraction on the other side of the neck. (Dr. J. R. Reynolds, p. 50.)

Anæsthesia of a limb.—The cases of anæsthesia of a limb, in which *par excellence* electricity is of service, are not those occasionally met with accompanying some acute cerebral disease, but those which are more or less "hysterical" in their origin. There is generally marked anæsthesia of a limb, associated with a certain amount of awkwardness of movement, sometimes with definite loss of power. Cases of this kind, which have lasted for months or years, will be not unfrequently cured by electricity, after two or three applications. (Dr. J. R. Reynolds, p. 57.)

EPILEPSY.—It is essential to remember this clearly established fact—that during an attack of epilepsy there is anæmia of the brain, owing to contraction of the cerebral capillaries and small arterial vessels. This takes its origin in anæmia or exhaustion, and any cause whatever which tends to produce an anæmic condition of brain, whether sudden or gradual, is sufficient to produce convulsions. Extensive disease may occur in the centre of the brain; but, unless the surface be involved, the central pathology will not be associated with epilepsy as a concomitant. (Dr. J. T. Dickson, p. 88.)

INSANITY.—*Chloral.*—Chloral is invaluable in cases of insanity, procuring sleep when given in large doses, and calming excitability when given in smaller doses during the day. One patient required 45 grains to cause sleep when in the sick ward, but placed in a dark cabin by night, 20 grains answered the purpose. (Dr. W. Macleod, p. 123.)

NEURALGIA.—*Electricity.*—In painful affections, such as the neuralgiæ, migraine, sciatica, tic douloureux, and also in some conditions of modified sensibility, such as the spontaneous feeling of heat or cold, the sense of numbness, tingling, "pins and needles," or such like discomforts, electricity is often of considerable service. The continuous galvanic current should be used, and it should be only of such strength as to be just perceptible by the patient. It should be applied by well-wetted sponges. (Dr. J. R. Reynolds, p. 63.)

Supra-Orbital Neuralgia.—Removal of a portion of Nerve.—Supposing, owing to the severity of the patient's sufferings, a portion of the supra orbital nerve is removed, the patient usually remains free from pain for three or four months, after which time it gradually returns, and the operation has again to be performed with like result. (Dr. J. Bell, p. 68.)

SCIATICA.—In a small porcelain vessel mix one grain of morphine and three grains of extract of belladonna with six drops of creosote. Whilst the patient is standing, make small incisions through the skin and subcutaneous cellular tissues alternately on either side of the nerve. Having wiped off the effused

blood, rub in the composition. The morphine and belladonna allay the pain, and the creosote sets up, if properly applied, a certain amount of local irritation, which is very desirable. To every patient suffering from sciatica iodide of ammonium should be given. Its therapeutic power is superior to that of the iodide of potassium. (Dr. J. Waring-Curran, p. 72.)

TETANUS.—*Calabar Bean.*—Calabar bean alone possesses the power of paralysing the motor tract of the spinal cord, without depressing the action of the heart to any great degree. This pow r at once marks it out as a suitable remedy in tetanus. An interesting case is related illustrative of this plan of treatment. During the attack no less than 40 grains were given by the skin and 49 by the mouth. (Mr. A. Boutflower, p. 77.)

Chloral.—Chloral is reported well of in tetanus by those who have tried it. We give one case which was so treated in Guy's Hospital. We must say, however, after the perusal of several such cases, that the results are not by any means very striking, and that the remedy seems far better adapted for employment in many other diseases than in tetanus. (Mr. J. Birkett, p. 78.)

A case of acute traumatic tetanus is related in which three drachms and a half of hydrate of chloral were given in twenty-four hours. The first dose was one drachm, and the rest was given in doses of half-a-drachm at a time. The patient was asleep within five minutes of the first dose. Eight hours afterwards the temperature had fallen from 103° to 99·5°, and there was marked improvement in all the symptoms. During the remainder of the case the chloral was given on an average at the rate of two to two and a half drachms per diem—in all, six ounces and a quarter of chloral during the three weeks treatment. It was found that, if any time the chloral was not given for a period of more than six hours, the symptoms invariably became more intense, and a larger dose was required afterwards. (Dr. A. Ballantyne, p. 80.)

Nitrite of Amyl.—The physiological action of nitrite of amyl is directly exerted on the ganglionic nervous tract; it paralyses so that the nervous supply over the extreme vascular system is impaired; and the muscular system generally, if the effect be sustained, is thrown into relaxation. Hence its value in cases of excessive spasmodic action. Lately, Mr. Foster, of Huntingdon, has administered the nitrite with complete success in a case of traumatic tetanus, holding the convulsions in check for the long period of nine days. Five minims should be administered by inhalation, whenever an attack is threatened. It has also been used with success in angina, asthma, and colic. (Dr. B. W. Richardson, p. 376.

AFFECTIONS OF THE CIRCULATORY SYSTEM.

ANGINA PECTORIS.—Angina Pectoris is nothing more or less than a spasmodic contraction of the muscular structure of the heart and aorta. It arises from morbid innervation of the heart by means of the abundant supply from the sympathetic and its ganglia. In many cases it is reflex in its character, the exciting cause being some such affection as ossification of the coronary arteries, or disease of the aorta. Moreover, just as there are cases of epilepsy which are idiopathic, so there are probably many cases of angina pectoris, the essential nature of which consists in an inherent constitutional predisposition to the malady, expressing itself whenever the nervous system is especially irritated or excited by causes of any kind operative primarily in any part of the body. (Dr. J. Chapman, p. 110.)

HEMORRHAGE—*Arrest of, by Over-flexion of a limb.*—We possess in over-flexion of a limb a blood-controlling agent of considerable power which can be applied on the shortest notice, and which requires neither instruments nor apparatus than can be obtained in the poorest cottage. In the upper extremity, if the forearm is bent on the arm with a roll of lint or linen on the bend of the elbow, the pulse is always entirely stopped; and in the lower extremity, if the leg is flexed on the thigh and the thigh on the abdomen the pulse in the anterior tibial is almost invariably stopped. When we remember the difficulty of arresting hemorrhage from a wound of the palmar arch, and read in surgical works that secondary hemorrhage from the deep arteries of the leg is a sufficient reason for amputation, we see the importance of these observations. This is further enhanced by remembering how we may be called

upon to treat hemorrhage from wounded arteries of a limb, when perhaps far from home, and in small dark rooms with insufficient light. (Dr. G. Y. Heath, p. 160.)

PALPITATION.—*Diagnostic Value of.*—Palpitation is solely diagnostic of a disturbance of the balance which exists between the blood to be driven by the heart and the power to drive it; and that too in the direction of cardiac inability. This idea is founded not only on its existing causes, but also on the known action of the remedies which enjoy the greatest reputation for efficacy in allaying it. (Dr. J. M. Fothergill, p. 104.)

AFFECTIONS OF THE RESPIRATORY SYSTEM.

ASTHMA.—In severe paroxysms of asthma chloral is worth a trial. In congestive bronchitis it has proved equally beneficial. It should be given in doses of from twenty to thirty grains. (Mr. A. M. Adams, p. 372.)

PNEUMONIA.—It is well to bear in mind that the actual occurrence of pneumonia is preceded by blood-poisoning. The exudation into the lung is the direct result of the state of the blood, and when it occurs there is a fall of temperature, it in fact may be looked upon as analogous to the eruption in small-pox. If we can catch the disease in the stage of the initiatory fever, it is in many cases possible to prevent the pulmonary mischief by favouring exudation through other channels. As a check to the action of the skin is the exciting cause of the disease, in a large proportion of cases the restoration of a free action of the skin is the main object of treatment. An emetic, or a purgative dose of calomel orcolocynth are frequently of great service with the same object. This is acting upon the hint conveyed by the fact that vomiting and diarrhœa not unfrequently occur spontaneously at the commencement of a pneumonic attack. (Dr. G. Johnson, p. 114.)

TUBERCULAR MENINGITIS WITH CONVULSIONS.—In cases of tubercular meningitis with convulsions in children, relief may be obtained by giving chloral in five-grain doses every three hours until a sedative effect is produced. (Mr. A. M. Adams, p. 372.)

AFFECTIONS OF THE DIGESTIVE SYSTEM.

CHOLERA COLLAPSE.—After death from cholera collapse the pulmonary vessels and right side of the heart are found full of blood, whilst the arteries and left side of the heart are empty. This is owing to spasm of the arterial vessels, and this spasm is the one constant symptom present in the disease. It is this which we must endeavour to combat if we would treat the disease successfully. No doubt if we could neutralise the poison it would be better, but we cannot, and probably never shall. If the spasm could be relieved, warmth of surface and restoration of the circulation would at once ensue. All experience in India proves that the use of opium and of large doses of stimulants is actually injurious. (Dr. T. Farquhar, p. 42.

DIARRHŒA AND DYSPEPSIA—*Raw Meat.*—Raw meat is a remedy, or rather aliment of great value in cases of dyspepsia, in which undigested food causes irritation of the bowels and attacks of diarrhœa. It seems to furnish the most efficient kind of nutriment with least inconvenience from bulk or other quality, and is digested and absorbed with as little fæcal residuum as possible. In cases of acute summer diarrhœa in children, raw meat is in itself both a remedy for the diarrhœa and a nutriment for the child; also in the chronic diarrhœa of children, in the habitual diarrhœa associated with "marasmus," and, lastly, in the cases of obstinate vomiting of pregnancy, whether associated with diarrhœa or not, it is frequently of the greatest service. It must be prepared by pounding or scraping raw beef or mutton, so as to get out the red soft muscular substance as free as possible from all fibre and fat. It must be a soft pulp, giving no feeling of resistance when squeezed between the fingers. (Dr. R. Druitt, p. 121.)

FISTULA-IN-ANO.—*New Instrument for the Operation.*—Mr. Weeden Cooke uses a scissors constructed for him by Messrs. Weiss. The finger having been passed into rectum as a guide, one blade of the scissors is introduced into the

fistula up to its extreme point, and then the other blade into the rectum. The two blades are then connected by a small screw, and by one rapid scissors-action the sphincter is divided. (p. 167.)

GASTRODYNIA.—*Arsenic.*—When the pain seizes the patient independently of digestion, and is not preceded or followed by any dyspeptic symptoms, the judicious use of arsenic is the best treatment. The bowels are subject to the same kind of pain, but whether it occurs in the stomach or the bowels it is essentially neuralgic in its character. It is often associated with mental depression. The curative effects of the arsenic are most striking in severe cases of paroxysmal pain, but many cases yield to it which closely resemble dyspepsia in the character of the pain. In most cases the liquor arsenicalis answers every purpose, but when the system is more than usually susceptible of the action of the mineral the liquor sodæ arsenitis seems to irritate less. (Dr. A. Leared, p. 119.)

TONSIL GUILLOTINE.—There is great difficulty in removing the tonsils of children, owing to the tendency to shut the mouth when the tonsils are pressed upon. To obviate this, Mr. Ewens, of Cerne Abbas, has had a gag adjusted to the guillotine of Mathieu, which at the same time acts as a tongue depressor. After being adjusted over the tonsil by a single continuous movement of the thumb, transfixion and amputation are instantaneously accomplished, without a chance of failure, and with the utmost facility, the mouth being kept wide open by the gag for the adjustment of the instrument over the tonsil and during its removal. (Dr. J. Ewens, p. 167.)

AFFECTIONS OF THE URINARY ORGANS

ACUTE BRIGHT'S DISEASE.—Rest in bed with a scanty diet will suffice for the cure of many cases of acute Bright's disease, without any other treatment whatever. The diet may consist of milk alone, or milk with an egg or two in the course of the day, or with the addition of beef-tea or animal broth. Under this regimen the congestion of the kidney soon ceases, and the urine again becomes copious and free from albumen. When the congestion is extreme, local bleeding by leeches, or cupping on the loins, is useful. Alcohol in any form is as a rule injurious, as it imposes extra work on the kidneys. In all cases of recovery from long continued albuminuria, iron in one form or another is called for, and the tincture of the perchloride and the syrup of the phosphate are the most suitable preparations. (Dr. G. Johnson, p. 123.)

ALBUMEN IN THE URINE.—*New Test for.*—Add to the liquid to be examined, in a test tube, ten minims of alcohol of specific gravity 0·805, shake thoroughly but gently, so as to avoid the production of froth. Then drop in the same quantity of carbolic acid and shake very thoroughly. Allow it to stand for a minute; and if the merest trace of albumen is present, distinct flocculi will be seen floating in the liquid. This is much more delicate than the heat and nitric acid test. (Dr. C. M. Tidy, p. 128.)

LITHOTRITY.—From 184 cases of lithotrity in the adult, Sir Henry Thompson deduced the following rule: That lithotrity should be applied to all calculi obviously less than a quarter of an ounce in weight, easily discovered by sounding, and that all larger ones should be operated upon by lithotomy. The rate of mortality will correspond with augmentation in the size of the stone, and with the amount of existing disease and age on the part of the patient. Given a small stone in a fairly healthy person, and success is certain. (Sir H. Thompson, p. 167.)

STRICTURE OF THE URETHRA.—*New form of Bougie.*—Mr. Jackson, of Wolverhampton, describes a form of bougie, or "cathether conical sound," which he devised some years ago, and had a set of them made for the treatment of stricture by simple dilatation. The form of the instrument, instead of resembling simply an elongated cone, is made so as to consist of two cones, their bases being conjoined. The first cone commences at the extreme point of the instrument and extends for a distance of three inches, its base here meeting with the base of the second cone, and this latter, gradually and almost imperceptibly diminishing in size, reaches the handle, a distance of six inches. It is evident that a maximum cylindrical thickness is obtained at a certain known distance from the point. The instrument is channeled from a short

distance below the point, so as to combine the advantages of both catheter and bougie, without the disadvantage of grazing the stricture in passing, as is done by the eyelets of a catheter. (Mr. T. V. Jackson, p. 169.)

URINARY CALCULUS.—*Examination of*:—1. Heat a portion of the powdered Calculus upon platinum foil.

Destroyed. (*a*) *Uric acid: Ammonic urate: Cystine: Cholesterin: Bile-pigment.*

(*b*) Uric acid from *Calcic and Sodic urates.* Ammonia from *Triple Phosphate.* Oxalic acid from *Calcic oxalate.*

Not Destroyed. (*c*) *Calcic Phosphate: Calcic Carbonate.*

(*d*) Calcic Carbonate from *Calcic Oxalate and Urate.* Sodic Carbonate from *Sodic Urate.* Magnesic Phosphate from *Triple Phosphate.*

If it chars and gives odor of burnt feathers, add to another portion a drop of concentrated nitric acid and evaporate to dryness; pink color; cool, and add ammonia: purple color. *Uric acid* or *Urates.* If the odor is peculiarly disagreeable, resembling carbonic bisulphide, dissolve in ammonia, and allow the solution to evaporate spontaneously; microscopic six-sided plates indicate *Cystine.* Mix another portion with Lime. Ammonia may be evolved from the *Urate* or *Triple Phosphate.*

2. Ignite another portion in the blowpipe flame until it burns entirely away (Class (*a*), see above), or leaves a white residue. If it fuses, it consists of the mixed *Phosphates of Calcium, Magnesium* and *Ammonium.* Place a portion of the residue on red litmus paper and moisten with a drop of water; alkaline reaction indicates *Soda* or *Lime* from Class (*d*) or from *Calcic Carbonate.* Dissolve the rest of the residue in water and filter. If the filtrate is alkaline, add a drop of hydrochloric acid and evaporate cautiously to dryness; microscopic cubical crystals prove the presence of *Sodium.* Dissolve the residue, insoluble in water, with hydrochloric acid, observing whether or not any effervescence due to carbonic acid takes place; add a comparatively large quantity of ammonic nitro-molybdate, and heat; a yellow precipitate indicates *Phosphoric Acid.*

3. Boil a portion of the powdered calculus in dilute hydrochloric acid; effervescence indicates calcic carbonate; filter; neutralize the solution by ammonia, and add acetic acid in excess; a turbity indicates *Calcic Oxalate.* To the clear solution (or the filtrate if calcic oxalate is present) add ammonic oxalate; a precipitate indicates *Calcium, which was not previously in a state of oxalate;* filter, if necessary; add ammonia, and stir; a white crystalline precipitate indicates *Magnesic Phosphate.*

4. Biliary Calculi. *Cholesterin* is soluble in boiling alcohol, in ether, or in benzole; and, upon spontaneous evaporation of the solution, is deposited in rhombic nacreous laminæ, which polarize light.

Bile-pigment is insoluble in ether; soluble in potassic hydrate, and, when treated with nitric acid, becomes first green, then blue, passing into violet, red and yellow. (Dr. Campbell Brown, Liverpool Medical and Surgical Reports, p. 43.)

AMPUTATIONS, FRACTURES, AND DISEASES OF BONES AND JOINTS, ETC.

ANTISEPTIC TREATMENT SUITABLE FOR WAR.—Wash the wound thoroughly and also the surrounding skin with a saturated solution of carbolic acid in water, introducing the fluid by means of a syringe, and manipulating the parts freely so as to ensure its penetration to all parts of the wound. Any vessels should be tied with properly carbolized catgut ligature, both ends of which should be cut off close to the knot. If none of this ligature is at hand, torsion should be employed; but if it is absolutely necessary to use a ligature, it should be carbolized. Then, after removal of any foreign substance, carefully cover the wound with two or three layers of oiled silk smeared on both sides with a solution of carbolic acid in five parts of any of the fixed oils. Next, apply a thick layer of linen, lint or charpie, soaked in the oily solution of carbolic acid, and sufficiently large to cover the edges of the oiled silk at least three inches all round. Lastly, cover the oiled cloth or lint with a piece of thin gutta percha sufficiently large to cover everything by an inch or more

and retain it securely in position by a roller steeped [illegible] this again wrap a still larger piece of folded cloth, say a foot square, steeped in the oily solution of carbolic acid, and cover it with a piece of silk or gutta percha. (Prof. Lister, p. 137.)

AMPUTATION AT THE KNEE-JOINT.—There is this great advantage in amputation at the knee-joint, that it is not attended with the shock to the system which occurs when the femur or the tibia high up is divided. It is not necessary to remove the condyles of the femur, but the anterior flap must be long and broad, so that they may be well covered. As there is always a possibility of a little sloughing of the anterior flap, it is well to preserve a short posterior flap also. The actual line of the basis of the flaps should be a finger's breadth below the level of the articulation. (Mr. C. F. Maunder, p. 129.)

AMPUTATION BY A CURTAIN FLAP OF INTEGUMENT.—It is a mistake to include a quantity of muscle with vessels, nerves, and fascia, in the flap of a stump intended to bear weight. The skin only should compose the anterior flap. In amputation of the thigh the posterior flap should hardly exist at all—the incision should here be made slightly curved forwards, whilst all the muscles should be cut transversely, and in a line with the bone section. The anterior flap should be sufficiently long to cover the whole surface of the wound. The line of suture will be at the posterior and inferior margin of the stump. One great advantage of this plan is that the flap by its own weight falls over the face of the stump, requiring little or no pressure to keep it in position. There is no danger of conical stump, and but little of pyæmia, phlebitis and deep-seated suppuration. (Mr. J. D. Hill, p. 131.)

CARIOUS AND DISEASED BONE.—*Local Application of Sulphuric Acid.*—If sulphuric acid will dissolve and soften bone out of the body, why should it not do so when applied to dead bone, contained in the living body? Acting upon this idea, Mr. Pollock, of St. George's Hospital, has based a most successful plan of treatment in cases of carious and necrosed bone. Supposing the case to be one of necrosis of the bones of the skull, he touches the dead bone daily with a lotion of equal parts of strong sulphuric acid and water. It is found that the necrosed bone crumbles away from day to day, and rapidly disappears. As this takes place healthy granulations spring up from below, and fill up the space formerly occupied by the bone. The action of the acid is limited to the diseased bone; it does not act upon the healthy bone. It is perfectly safe and unirritating, even should it touch the dura mater. The antiseptic qualities of the acid are also no small recommendation. It may be used upon lint, or by means of a syringe, or simply brushed over the part if sufficiently exposed for that purpose. (Mr. G. Pollock, p 145.)

Inflammation of the Interior Structure of Bone.—Inflammation of the Interior structure of bone is, as a rule, allowed to go on for months or years, until softening of its structure, abscess, and other well-known disastrous effects are produced. Why should this inflammation be treated differently in bone, to what it is in other parts, in which case the surgeon does not hesitate to cut down upon the part and give relief? Take a knife and cut down upon the inflamed bone, using first the knife, and then applying a point of potassa cum calce, and so on alternately until the bone is reached; then by means of a gimlet or drill perforate the hard tissue into the centre of the inflamed bone. The caustic must then be applied into the bottom of the hole made. Prompt relief follows, and a thin reddish serum continues to flow from the opening until healthy suppuration takes place. In this manner the trochanter has been perforated in thirteen cases of morbus coxæ. The use of the caustic in cutting down on the bone renders the operation bloodless. Chloroform should of course be given. (Mr. F. Kirkpatrick, p. 150.)

DISLOCATION OF THE SHOULDER.—*New Plan for Reducing.*—Seat the patient on the floor with his back resting against the side of a bed. Stand by the bed and gradually raise the dislocated arm from the body at the same time placing your foot, without a boot, upon the top of the shoulder to steady it. Extension upwards must be gradually increased until the bone slips into its place, which it will usually do with the greatest ease. (Mr. George Lawson, St. Bartholomew's Hospital Reports, vol. vi. p. 4.)

DISTENSION OF THE FRONTAL SINUS.—Great deformity arises in cases of distension of the frontal sinus from pent-up secretion of pus, owing to the displacement of the eye which occurs. The only successful plan of treatment is to re-establish an opening into the nasal cavity. The surface of the

must first be exposed by a longitudinal incision; then the tumour itself is to be laid open to the same extent as the incision. It must then be ascertained at what point the tip of a finger in the sinus most nearly approaches the tip of a finger of the other hand passed up the nostril. After a little search it will be found that at one part the fingers will almost meet, there being only a thin plate of bone between them. The finger in the nostril being retained as a guide, a passage must now be forced into the nose, and an india-rubber tube, with small drainage holes cut at short distances, introduced, one extremity of which is to be fastened to the forehead, whilst the other protrudes from the nose. A free discharge will probably drain through the tube, which should be shifted twice a day, and previous to each shifting the cavity of the cyst should be thoroughly cleansed with a weak solution of carbolic acid squirted in through the drainage tube. (Mr. G. Lawson, p. 159.)

NEW BULLET EXTRACTOR.—Surgeon Tuson, of the Bengal Medical Staff, describes a new bullet extractor, the construction of which will be understood at once by referring to the wood-cut at p. 214. It contains a central screw, which can be made to penetrate the bullet when seized by the three grasping points. It appears to be an improvement upon the ordinary bullet forceps. (p. 157.)

REFRACTURE OF BONES.—Although at the end of two months a femur which has been broken will bear the weight of the body, because the weight is vertical, yet it will yield to force laterally applied even at the end of a longer period than this. The femur has been refractured at the end of eleven weeks, and the bones of the forearm at the end of seventeen weeks. Chloroform having been administered, bring the limb to the edge of a table, which is covered with half-a-dozen folds of blanket. The weight of the body of the operator must then be brought slowly and gradually to bear upon the point of fracture; and any additional force in moderation may be resorted to. There need be no fear of breaking the bone in any other place than at the old place of fracture, for it is almost impossible for a man of good muscular power to break even a radius in the dried state, much more a femur. (Mr. F. C. Skey, p. 132.)

SPLINTS.—*New Material for Splints.*—Hatters' felt, cut to the required shape, softened in hot water, and moulded to the limb, forms an excellent splint for fractures in children. It stiffens as it dries. (Mr. Hutchinson, p. 135.)

Flannel and Plaster of Paris Splint for Leg.—Lay a double layer of flannel underneath the leg, and, bringing the edges forwards over the crest of the tibia and the dorsum of the foot, cut off all the material over and above what is required to neatly and entirely cover the limb, including the fold at each side of the ankle. Now make a double row of stitches about half an inch apart along the whole length of the posterior part of the flannel splint, keeping accurately to the middle line. Next replace the flannel on the limb, pinning up the layer next the skin, but allowing the outer layer to fall back on each side. The outer surface of the inner layer must then be spread with plaster of Paris to a depth of about two lines, the other layer is then brought up and accurately adjusted. The two layers of flannel, with the plaster of Paris between them, will soon form a hard firm splint accurately moulded to the limb. It can be retained in position by bandages. The part between the two rows of stitches behind being free from plaster of Paris imparts a certain amount of elasticity to the splint, and forms a hinge, enabling its removal or temporary bending back for inspection. (Mr. C. Heath, p. 134.)

SUPPURATIVE SYNOVITIS OF THE KNEE-JOINT.—In cases of suppurative synovitis of the knee, if the patient is old and enfeebled in constitution, the prospect of affording relief by laying open the joint is by no means good. A case of this kind, in which the patient was exhausted by long confinement and suffering is related by Mr. Bickersteth, of Liverpool. He opened the joint by an incision four inches in length on its outer side and pressed out a considerable quantity of matter, the entrance of air being prevented by keeping folds of lint soaked in carbolic oil over the incision. The interior of the joint was next washed out by throwing in upwards of a pint of the watery solution of carbolic acid (1 part in 40). This fluid was then well pressed out, and the wound dressed with carbolic oil on lint. The thigh was supported by a many-tailed bandage, so as to keep the walls of the abscess in contact. A great deal

of care and skilful management was subsequently required, but the case did well, and is an excellent example of the value of the antiseptic treatment. (Mr. E. R. Bickersteth, p. 140.)

TRANSVERSE FRACTURE OF THE PATELLA.—Mould a gutta-percha splint to the front of the limb and another to the back of it. Cut a hole in the anterior splint the size of the patella. Bandage the limb carefully over the splints, forcing the patella into the aperture in the anterior splint. (Mr. J. Woodman, p. 134.)

AFFECTIONS OF THE SKIN, ETC.

ABSCESSES.—In all abscesses give bark freely, and generally wine; and the larger the quantity of each borne the earlier will the abscess mature. (Mr. F. C. Skey, p. 152.)

New Instrument for the Evacuation of.—Dr. Dieulafoy, of Paris, has invented a syringe somewhat like the subcutaneous injection syringes, for the evacuation of deep-seated abscesses. It is of glass, and contains about two ounces, and is fitted with two needles, one very long and slender, the other shorter and wider. There is a lateral tube, closeable by a stop-cock, through which the syringe can be emptied without withdrawal from the wound. The inventor has operated upon the joints, the pleura, and even the head in cases of hydrocephalus, and in many cases with great advantage. (p. 118.)

BURNS.—*Local Stimuli.*—In all cases of burns and scalds resort at once to local stimulants. The soothing system of oil and cotton wool answers no purpose whatever beyond that of excluding air. Fifty years ago Dr. Kentish, of Bristol, first recommended this plan, the application recommended by him being spirits of turpentine. This caused considerable pain for two or three hours after its application, but after that there was complete freedom from it. Dr. Kentish's treatment was pursued in most of the large hospitals with success, but it gradually went out of use, why it is difficult to say. The application of a strong solution of nitrate of silver affords, however, even more complete relief, than does the turpentine, and it has this advantage, that its strength can be modified to suit each particular case. The lotion used should be of the strength of five grains to the ounce in the case of a child, up to twelve grains to the ounce in that of an adult. After the free application of the nitrate, the parts should be wrapped up in cotton wool, and an opiate administered in brandy. (Mr. F. C. Skey, p. 187.)

CICATRICES FROM BURNS.—The evils attendant on large cicatrices from burns may be relieved by very simple means, viz., the relaxing of the tension caused by these bridles by making a large number of small divisions of the cicatrix. The incisions may be close together, and eight or nine lines in length. These small wounds will heal from the edges, giving a greater length of cicatrix and more freedom to the joint, and the process may be repeated again and again if necessary. (Mr. F. C. Skey, p. 189.)

CORNS.—*Radical Cure of.*—Cover the surface with a vesicating plaster well charged with cantharides powder. In twenty-four hours the raised cuticle round the corn can be removed and a coating of tannin laid on the exposed and tender surface, then a tannin ointment laid over the part. The rationale of the process is in fact "tanning the corn." (M. de Pontevès, p. 192.)

GANGLIONS ON THE WRIST.—Bending the hand forwards in order to tighten the skin over the cyst, pass vertically into the tumour a broad-shouldered lancet. By a lateral movement of the instrument the orifice will be dilated, and the contents will freely escape. The sac must then be compressed and kneaded in every direction that every particle of its contents may be evacuated. Then apply a well made thick compress of lint, and strap it down tightly with plaster, and, lastly, apply a roller bandage. In forty-eight hours the wound has healed, and the ganglion is seen no more. (Mr. F. C. Skey, p. 151.)

GLANDULAR ENLARGEMENTS AND SCROFULOUS DISEASES.—*New Iodine Paint.*—The following is an excellent application in cases of glandular enlargements and scrofulous diseases, wherein iodine is called into requisition. Rub down half an ounce of iodine and a like quantity of iodide of ammonium in a Wedgwood mortar, and gradually dissolve it in twenty ounces of rectified

spirit ; to this add four ounces of glycerine, shaking the solution well. Iodide of ammonium is a more powerful absorbent than iodide of potassium. (Dr. J. Waring-Curran, p. 275.)

HARE-LIP,—*New Operation for.*—Dr. W. Stokes, Jun., of Dublin, describes an operation for hare-lip which appears to us well worth studying by operating surgeons. The especial design of it is to avoid not only the notch at the red edge of the lip, but also the vertical groove which in all cases hitherto operated upon exists to a greater or less degree, and which is produced by the contraction or falling in of the tissues at this situation. The details of the operation can only be understood by reference to the original article. (Dr. W. Stokes, jun., p. 184.)

HERPES CIRCINATUS.—This disease is generally rapidly curable by the application of local astringents, such as tincture of perchloride of iron, sulphate of copper, or tincture of iodine. No other treatment is necessary. (Mr. C. H. Robinson, p. 190.)

HOUSEMAID'S KNEE.—This is not produced by direct pressure, but by side to side movement, in fact, by friction. The contents may be liquid, or a thick fleshy mass of lymph. In the treatment iodine is worthless, blisters both worthless and painful, and excision dangerous. A stout thread of silk passed through the centre of the tumour will convert the whole mass into an abscess, and this end is generally attained within a week or ten days. When converted into an abscess it simply requires opening freely. (Mr. F. C. Skey, Lancet, July 30, 1870, p. 153.)

Most cases of housemaid's knee can be treated successfully by the application of the ammoniacum and mercury plaster, along with rest. If acute symptoms are present they should be subdued before the plaster treatment is commenced. (Mr. C. R. Thompson, p. 152.)

RANULA.—Pass a simple thread of silk or flax through the centre of the tumour by means of a curved needle. In five or six days the ranula will be found reduced to less than half its original size, leaving the thread at some distance from it, but still clinging to the mucous membrane. This first thread is then removed and a second thread applied through the centre of the residue of the tumour, which will finally disappear in from three to four days. (Mr. F. C. Skey, Lancet, July 30, 1870, p. 147.)

HEALING OF WOUNDS BY TRANSPLANTATION.—If a minute portion of healthy skin, the size of a millet seed, be transplanted to the surface of a large granulating sore resulting from a burn, and covered with a small piece of plaster, it will become the centre of formation of fresh skin. A slight incision should be made in the granulations, and the bit of skin embedded in them. At the end of a week there will be nothing to see of the transplanted skin, but in another week there will be apparent a spot or island of skin, which will rapidly increase in size. This discovery opens quite a new plan of treatment, applicable to all cases where there is loss of cutaneous structure. The credit of the original idea is due to M. Reverdin, but its introduction into practice in England to Mr. Pollock, of St. George's Hospital. (M. Reverdin, Mr. G. Pollock, p. 156.)

A number of cases are related in which Mr. Mason, of the Westminster Hospital, performed the operation of skin grafting upon granulating surfaces. Some were very successful, one or two unsuccessful. Mr. Mason comes to the conclusion that its success depends upon the ulcer being in a healthy condition. For instance, four pieces of skin were grafted upon an unhealthy ulcer of the leg, and they all failed to grow. The pieces transplanted were rather larger than those transplanted by Mr. Pollock, and thus did not disappear for a time, as is the experience of the latter gentleman. The transplanted skin was covered by a strip of transparent plaster. (Mr. F. Mason, p. 191.)

SMALL-POX.—*To prevent pitting after.*—By means of a small camel's hair brush touch the apex of each pustule as soon as the eruption becomes manifest with strong vesicating liquid. The face should then be varnished over with flexile collodion, made by mixing equal parts of neatsfoot or lard-oil, and collodion. This at once allays the pain of the blistering, and limits its effect to the apex of the pustule in extent. After twenty-four hours a lotion formed of starch and glycerine, may be applied two or three times a day by means of a flat camel's hair brush, so as thinly to cover the part and exclude the atmosphere. (Mr. J. Startin, p. 193.)

WOUNDS.—*Iodine as a topical application.*—Iodine has a destructive effect

upon living germs, just like that of carbolic acid, and it is probably owing this that it has the excellent effect as a local application to wounds which it is found to have. Applied as a lotion, containing two grains to the ounce of water, it checks all putrefactive action, and promotes rapid healing. It appears to have a wonderful power of separating dead or dying tissue from the living and active, hence it is very likely to prove serviceable in carbuncle. In a case of scrofulous abscess in the groin, a solution containing in addition a little iodide of potassium was injected twice a day for three days, when rapid contraction and healing ensued. (Dr. J. Stirton, p. 155.)

VENEREAL AFFECTIONS.

GONORRHŒA.—Commence with a mild aperient, and for the next week or ten days simply direct your patient to abstain from active exercise, and moderate the amount of daily consumption of wine or other alcoholic drinks if large, the diet otherwise remaining the same. As soon as the local pain and profuse discharge are somewhat reduced, resort to quinine, iron, or other tonics; ten or twelve grains of citrate of iron and quinine twice daily, will answer the purpose well. At the same time wine may be given on the same tonic principle. At the expiration of about a week from the commencement of the treatment by tonics, an injection of one grain of sulphate of zinc to the ounce of water, used night and morning, may be prescribed. The above terrible plan of treatment will often cure a case of primary gleet in four days. (Mr. C. Skey, p. 200.)

CONSTITUTIONAL SYPHILIS.—Very few cases refuse to yield to a combination of 1-8 of a grain of perchloride of mercury, five to fifteen grains of iodide of potassium, and a scruple of chlorate of potash, taken three times a day in some bitter infusion. The chlorate of potash increases the efficiency of the mercury, besides preventing salivation. (p. 282.)

SARSAPARILLA IN SYPHILIS.—*The mode of administering.*—Perhaps no remedy is so valuable in constitutional syphilis as sarsaparilla. Nevertheless its use appears almost to have gone out of date, owing to its not having been given in sufficient doses to produce its full effect. It has been in use in the Leeds Infirmary for a long period, chiefly under the advocacy of the late Mr. Samuel Smith. It is given in doses of four to ten ounces of decoction three times a day. The decoction used differs only in unimportant details from the compound decoction of the Pharmacopœia. The cases in which the sarsaparilla is most useful are those in which the system is thoroughly infected with syphilis, during the tertiary and visceral modes of its appearances. (Dr. T. C. Allbutt, p. 194.)

SLOUGHING SYPHILITIC SORE THROAT.—Great benefit may be derived by painting the diseased surface over with Calvert's liquid carbolic acid, unmitigated, by means of a camel's hair brush. The brush should be pushed well upwards and downwards so as to reach as much as possible of the diseased surface. After the first application a weak solution should be substituted and applied frequently. At the same time as good support as possible should be given, and, medicinally, five minims of liquor cinchonæ, five minims of Battley's solution of opium, and ten grains of iodide of potassium, in an ounce of water, three times a day. (Dr. C. S. Smith, p. 198.)

SYPHILITIC CACHEXIA.—*Chlorate of Potash.*—Chlorate of potash is often a remedy of great value in cases of syphilitic cachexia, accompanied by some local ulceration. It should be given in doses of ten grains, twice daily. In a case related, in which there were seven or eight small ulcers on the leg, a solution of chlorate of potash in glycerine, of the strength of one drachm to the ounce, was applied locally. The patient stated that the action of this was remarkable, and was visible every time he used it. (Mr. E. Wilson, p. 280.)

SYPHILITIC SKIN AFFECTIONS.—*Mercury.*—Few men have had better opportunities of judging whether mercury is really beneficial in syphilitic affections of the skin, than Dr. McCall Anderson, and his opinion is that "*it is* invaluable in appropriate cases." He considers that we are justified in *bringing the* patient under its influence. 1. When we have to treat one of the *earlier of the* cutaneous manifestations of syphilis in a person of sound constitution. 2. When some delicate organ, such as the eye, is simultaneously

affected. 3. When there is a circumscribed syphilitic eruption of old standing, which resists external applications, and iodide of potassium in full doses. (Dr. McCall Anderson, p. 196.)

To inject Mercury Subcutaneously.—Instead of administering mercury by the mouth, the process of subcutaneous injection may be tried. Dissolve four grains of perchloride of mercury in an ounce of distilled water, and of this from seven and a half minims at the least (*i. e.*, a sixteenth of a grain) to fifteen at the most (*i.e.*, an eighth of a grain) should be injected once daily. About three grains altogether is usually required to affect the system. It does not usually produce salivation, although stomatitis is a frequent result. The disadvantage is that much pain is experienced for several hours after each injection. (Dr. McAll Anderson, p. 197.)

AFFECTIONS OF THE EYE.

CATARACT.—*Operation for Extraction.*—The operation for cataract may be performed either too early or too late. If done before the whole of the lens has undergone the cataractous change, the unaltered portion will be liable to remain in the capsule, or in the chambers of the eye, producing irritation. If, on the other hand, it is delayed until calcareous deposits have taken place on the surface of the cataract, and on the inside of the capsule, the capsule will not retract as is desirable when scratched by the curette, and if the extraction is successfully performed the pupil is obscured. (Mr. H. Walton, p. 171.)

SOFT CATARACT.—No other operation than the very simple one of lacerating the capsule is required. The soft interior becomes rapidly absorbed. (Mr. H. Walton, p. 171.)

IRIDECTOMY.—*New Instrument for.*—It is very necessary to be able to vary the iridectomy at will, in order to render it as useful as possible in each individual case, for instance, if the effect desired is simply optical, a narrow artificial pupil is required: if remedial, as in glaucoma, the removal of a large portion of iris is necessary. With the ordinary iridectomy forceps this is a difficult matter to accomplish. M. Liebreich has invented a new instrument, whereby the shape of the artificial pupil may be made independent of the dimensions of the corneal incision. This instrument can be introduced through a narrow opening in the cornea, and will then expand widely in the anterior chamber. The limbs of these forceps do not open in the ordinary manner, but turn round a longitudinal axis in such a way that their rotation alone suffices to open and close their curved extremities. The movement of opening and shutting takes place without the part of the instrument which is engaged in the wound participating in the least degree. There is not the least difficulty in the use of these forceps. (Prof. Liebreich, p. 182.)

OPHTHALMOSCOPE.—*New form of demonstrating Ophthalmoscope.*—Place two rectangular prisms together, so that they form an equilateral cube, and upon one of its sides place a plano-convex object glass, with its plain surface against the surface of the cube. The whole must be enclosed in a brass mounting, with handle attached. There must be an aperture in the mounting, on the side opposite the lens, for the eye of the observer, and another on one side for a second observer. The fundus of the eye can be seen plainly and clearly by the second person, without any exercise of skill on his part. It is the invention of Dr. Wecker, of Paris. (Mr. R. B. Carter, p. 183.)

POSTERIOR SYNECHIA.—*New operation.*—Having fixed the eye with a pair of forceps held by an assistant, and inserted the speculum, pass a needle through the cornea, near its sclerotic margin, at a considerable distance on one side of the adhesion, and in such a direction that when pushed onwards it crosses at right angles that radius of the lens in which the adhesion is lying. The needle is pushed onwards into the anterior chamber, and so guided by the operator that its point becomes engaged in the pupillary margin of the iris at the root of the adhesion. The simple contact of the needle point with the iris is sufficient for this, and no attempt must be made to bury the needle in the tissue. By a gentle lever action of the needle point towards the periphery of the iris, the corneal wound being the fulcrum, the adhesion is broken down by being stretched and ruptured, and the needle being slowly withdrawn from the eye, the operation is completed.—(Dr. A. Ogston, p. 180.)

MIDWIFERY, AND THE DISEASES OF WOMEN AND CHILDREN.

ANÆMIA, LEUCORRHŒA, &c.—*Lactate of Iron.*—Lactate of iron is a tonic and blood-restorer of great value, especially in those numerous female complaints associated with great debility, such as anæmia, chloro-anæmia, leucorrhœa, and passive hemorrhages. In functional palpitation of the heart dependent upon debility, and in certain forms of dyspepsia, it may often be prescribed with advantage.—(Mr. J. C. Dickinson, p. 289.)

BLEEDING CANCER.—*Chloride of Zinc Paste.*—In a case of ulcerating cancer of the breast, the tumour having progressed so far that it is impossible to remove it by the knife or by any other means, there is perhaps no better plan of treatment than the application of chloride of zinc paste. A case is related by Mr. C. F. Maunder illustrative of this. The paste was not only applied to the surface of the sore, but two or three "points" of the same material, hardened, were forcibly pushed into an indurated portion of the adjacent mammary gland. By pursuing this plan of treatment healthy granulations appeared in the sore, and all unhealthy discharge and hemorrhage ceased. The wound at the last report of the case was contracting rapidly.—(Mr. C. F. Maunder, p. 35.)

CHLORAL IN LABOUR.—If chloral is given in doses of gr. xv. every quarter of an hour, and the further administration regulated according to the effect produced, it has been demonstrated that labour may be conducted from its commencement to its termination without any consciousness on the part of the patient. It not only does not suspend, but rather promotes uterine contraction. It is probable that labours under the use of chloral will be found to be of shorter duration than natural, for unconscious contractions appear to have more potent effects than those which are accompanied by sensations of pain. It seems, however, desirable to restrict the use of chloral to the earlier stages of labour, leaving chloroform in the position which it at present occupies in the later stages.—(Mr. E. Lambert, p. 203.)

In cases of tedious labour, the patient worn out, yet the os only partially dilated, give half a drachm of hydrate of chloral, and judging from three cases related, after a refreshing sleep the labour will be concluded with great rapidity and ease. It appears as if the os goes on dilating during sleep from chloral more rapidly than it did previously.—(Mr. J. G. Da Cunha, p. 208.

CHLORAL TO CHILDREN.—Chloral may be given with perfect safety and success to children, in doses of two grains to an infant of eighteen months, of three grains at three years of age, and of ten grains at nine or fourteen.—(Ed. of Medical Times and Gazette, p. 261.)

CHRONIC DIARRHŒA IN YOUNG CHILDREN.—Our object in treating these cases is to keep up the nutrition of the body with the smallest possible amount of irritation to the alimentary canal. Farinaceous food must be given with the greatest caution, and will be seldom found to agree except in very small quantities. Even milk must be sometimes dispensed with, and not uncommonly disagrees, even when diluted with water and thickened with isinglass. Liebig's farinaceous food for infants seldom disagrees, even with the youngest infants. In its preparation the starch is already converted into dextrine and grape sugar, so that the most important part of the work of digestion is performed before the food reaches the stomach. If the patient be a suckling child, he should be strictly limited to the breast. With children under a year old, milk will generally agree, especially if mixed with lime water. (Dr. E. Smith, p. 230.)

DYSMENORRHŒA.—In cases of painful menstruation, not having a mechanical origin, Indian Hemp will generally be found to afford relief. It may be given in twenty minim doses of the tincture three times a day, in combination with aromatic spirit of ammonia. (Dr. A. Silver, p. 219.)

FIBROUS TUMOUR OF THE UTERUS.—*Combined Enucleation and Avulsion.*—The following is a method of removing fibrous tumours of the uterus, which Dr. Matthews Duncan, of Edinburgh, states that he has often pursued with success. The margin of the os is first cut freely on each side with scissors. The tumour is then to be seized with a volsella and powerful traction made upon it, fresh hold being taken if the forceps tears its way out, and in some cases two volsellæ being used. At the same time the uterine wall is to be pushed back with the finger. Those forms of tumour which have but little connection with the uterine walls easily come away with a clean and lustrous surface, but those connected by bands of fibrous tissue require considerable

efforts on the part of the operator, and the operation is necessarily prolonged. The tumour in this manner is removed by *simultaneous* avulsion and enucleation. The operation cannot lay claim to elegance or brilliance, but it is successful. A great difficulty in the operation is the removal of the tumour through the undilated vagina. (Dr. M. Duncan, p. 227.)

HYSTERICAL INFLAMMATION OF INTERNAL ORGANS.—In hysteria the perverted nervous state of a part, such as the knee for instance, produces such alteration in the vascular state that changes very similar to actual inflammatory ones take place. There are present, heat, pain, and swelling. There is reason to think that what may take place in the knee may occur in an internal organ, such as the lung, resulting in cough, expectoration, pulmonary crepitation, and a condition in which there is dulness on percussion over the chest. (Dr. J. W. Ogle, p. 94.)

HYSTERICAL VOMITING.—*Diagnosis.*—The peculiarity of hysterical vomiting is that the food is returned without nausea, and apparently without effort, as it were by an easy act of rumination. (Dr. J. W. Ogle, p. 92.)

LEUCOCYTHÆMIA.—Leucocythæmia occurring in pregnancy is a disease of much graver importance than might *a priori* be supposed. It is liable to assume an acute form, terminating speedily in death. It is useless to wait for enlargement of the spleen to form our diagnosis, for then the case is hopeless We may in an early stage recognize the disease by microscopic examination of the blood. The symptoms are rapid pulse, feebleness, languor, and allowness of the skin. After a time there will be certain amount of turgescence of the thyroid and submaxillary glands. It is important to recognize the existence of the desease before the period of delivery, as there is always a good deal of hemorrhage after the removal of the placenta, and by being prepared for that we prevent the bad effects of loss of blood upon the already debilitated system. (Dr. R. Patterson, p. 223.)

PHLEGMASIA DOLENS.—*Opium.*—Opium not only relieves the pains of phlegmasia dolens, but is actually curative and, that with great certainty. The rule is to keep the pain thoroughly subdued, as the earlier the treatment is begun the more effectual it is. It is well to remember that the first symptom of the disease is usually pain low down in the pelvis at one side. It is generally not severe at first, but it is always accompanied by a certain hardness of the pulse. (Dr. C. C. P. Clark, p. 210.)

PUERPERAL CONVULSIONS.—*Chloral.*—A case is related in which after a dose of thirty grains of chloral the puerperal convulsions which had been previously frequent ceased almost at once. (Mr. R. D. Fox, p. 209.)

Chloroform and Barnes' Dilators.—In a case where the os is small and the violence of the convulsions threaten a speedily fatal termination to the case, the best plan of treatment is to keep the convulsions off by the continuous administration of Chloroform, to give time for dilitation of the os by means of Barnes's dilators. (Dr. A. Wiltshire, p. 238.)

PUERPERAL MANIA.—*Chloral.*—If chloral is given in puerperal mania the most successful plan seems to be, judging from a case related, to give it in one or two large doses, of say 60 grains, rather than in smaller and more repeated doses; the object being to procure a sound and prolonged sleep. (Dr. Head, p. 10.)

RIGID OS UTERI.—*Hypodermic Injection of Morphia.*—A quarter of a grain of morphia hypodermically injected in cases of tedious labour from rigid os uteri has the effect of producing rapid dilatation, in addition to its soothing effects upon the worn out and suffering system generally. (Dr. C. W. Shaw, p. 201.)

SORE NIPPLES.—You will rarely fail to cure sore nipples by applying rapidly a stick of nitrate of silver well into the crack or sore. Afterwards wash the nipple with a little warm milk and water. (p. 239.)

SORE THROAT IN CHILDREN.—*Insufflation of Dry Powders.*—In cases of sore throat in children the insufflation of a dry powder is much preferable to the application of a liquid. Gargles are of course out of the question. A dry powder is more potent than a liquid solution, it can be applied more rapidly and localised more accurately. For this purpose an insufflator may be used consisting of an elastic ball and tube, with an aperture, capable of closure, for introduction of the powder into the tube. The following powders have been employed in this way during a recent epidemic of sore throat in Manchester and its neighbourhood, alum, rhatany, tannin, borax, guaiacum, acetate of lead, calo-

mel, sulphate of copper, and nitrate of silver. If any of the last three be used, from a quarter to a half a grain should be mixed with five grains of pearl powder; in the case of the other drugs about five grains should be employed at each insufflation. (Mr. S. M. Bradley, p. 240.)

UTERINE TENTS.—*Difficulty in Introduction of.*—The most common and most annoying difficulty in the introduction of a tent is the result of a flexion of the body of the womb on the cervix; stricture at the internal orifice is produced, and it is almost impossible to introduce a straight tent. The only real escape from this difficulty is to employ a probe to replace the uterus as nearly as possible in its normal direction, and then to slip in the tent by the side of the metallic director. The use of a bent tent is not found in pratice to be feasible owing to the stricture at the point of flexion. (Dr. L. Aitken, p. 218.)

VESICO-VAGINAL FISTULA.—*Improvement in Speculum used in Operations for.*—The disadvantage of Sims's speculum is that it cannot be held by an assistant in the exact position desired by the operator for a great length of time. What is wanted is some means of fixing it in position. This can be accomplished by means of a fenestrated blade attached to the speculum, and made to fix over the back of the patient. The blade and the speculum are connected by a screw, by which the exact position is regulated. (Mr. T. S. Wells, p. 233.)

MISCELLANEA.

ANATOMICAL PREPARATIONS.—*New Preserving Fluid for.*—The following answers admirably, and does not cause contraction of soft textures. Arsenious acid, 20 parts; crystalized carbolic acid, 10 parts; alcohol, 300 parts; distilled water, 700 parts. The arsenious acid prevents decomposition, and the carbolic acid prevents the development of cryptogamic vegetation. M. Mehu, p. 282.)

ANÆSTHETIC PROPERTIES OF CARBOLIC ACID.—Carbolic acid has a striking anæsthetic power. "I employ it at present very commonly previous to the application of caustic to lupus and epithelioma. It benumbs the surface, it dulls the excessive sensibility of the superficial nerves, and it thereby permits the caustic application of our remedies with a great reduction in the amount of pain." (Mr. E. Wilson, p. 271.)

BICHLORIDE OF METHYLENE.—Mr. Spencer Wells states that for more than three years he has employed bichloride of methylene as an anæsthetic in many operations, and he feels certain that it is quite as effectual and much safer than chloroform, while it is less often followed by vomiting, and headache, and depression. (Mr. T. S. Wells, p. 234.)

CHLORAL.—*The Dose of Chloral.*—There can be no doubt that the dose of chloral should vary with the age of the patient and the amount of suffering to be relieved. A case of uterine cancer was relieved by ten grains three times a day; the dose was increased to fifteen grains with the effect of producing intoxication, and it had to be reduced to ten grains again. The safest plan is to let the primary dose be ten grains, and to increase afterwards if necessary. (Mr. W. Cooke, p. 266.)

Chloral occasionally a True Anodyne.—It appears from a case of neuralgia which occurred at the Royal Infirmary, Edinburgh, that chloral, contrary to the general opinion of its action, may be a true anodyne, relieving pain without producing sleep. (p. 68.)

CHLOROFORM INHALATION.—*Danger from Chloroform.*—The only condition of body which may be diagnosed as especially dangerous for chloroform is that of a weakened and dilated right side of the heart, with enlarged hemorrhoidal veins, varicose veins of the lower extremities, and large, full, yet not tense veins in the other parts of the body. Beyond this our knowledge ceases, for nothing definite is known. (p. 241.)

Prevention of Danger from Chloroform.—Be sure that the breathing is unimpeded, and that no weight of bed-clothes rests on the abdominal muscles. The sitting posture is unfavourable for the heart, and the lying position for the respiration. On all accounts the semi-recumbent position is the best, as it is generally the most convenient. It is well to keep the body from the beginning to the end of the operation in the same position, for, in experiments on animals it is found that they may be narcotised until the inspiratory act ceases, and yet the animal may recover; but at this crisis the smallest movement, the merest

handling of the body will prevent all chance of return of power. Although chloroform should not be administered to a patient whose stomach is charged with food, it is very bad practice to allow the system to become exhausted for want of food before the chloroform is given. (p. 242.)

Death from Chloroform.—If a warm-blooded animal is subjected suddenly to the vapour of chloroform, at a temperature over 70° Fahr., it will often cease to breathe and to circulate blood at once. Again, it is found that a considerable proportion of deaths from chloroform occur within the first minute of its administration. These things show us that it is a bad practice to commence its inhalation too abruptly, or to force on narcotism rudely, against time. The same observation extends to all bodies of the same family, as chloride of methyl, and bichloride of methylene. In these cases it is not the quantity of the vapour absorbed into the blood which kills: the killing is by a primary impression on the peripheral nervous surface from the vapour, and by consequent arrest of the action of the heart from asphyxia of the blood. Various other well-ascertained facts prove that the best plan of giving chloroform is to carefully feel the way in the first minute or two of administration, and then, in the adult to give it freely so as to push quickly into the third degree of anæsthesia. (p. 244.)

There are four modes of death from chloroform, In the first, by the immediate influence exerted by the chloroform on the peripheral nervous system respiration is for an interval suspended, there is accumulation of carbonic acid in the blood, irritation of the vagus, and consequent arrest of the action of the heart. Artificial respiration offers the best chance of recovery in this form of death, because the irritability of the heart is unimpaired. Nervous irritable people are these subject to this. The second mode of death may be called *epilepti from syncope;* it is instantaneous, and we find the arteries completely empty of blood, and the brain blanched and bloodless. This form of death occurs during the second stage, or that of excitement. The third form of death occurs when, from the slow and continued action of the narcotic, there is *paralysis of the heart.* This form of death is hopeless, artificial respiration has no effect on it. It is always preceded by intermittent action of the heart. The fourth form of death is a compound one—there is first depression of the heart and system from the chloroform, and then surgical shock is superadded. Hemorrhage may have aided the depression of system. Death here is by syncope, and is often sudden. It is very liable to occur from committing the error of supposing that in small operations it is only necessary to administer a little narcotic vapour, and, secondly, from proceeding to operate while the patient is excited and not insensible. The best means of producing artificial respiration is by Richardson's double-acting bellows. (Dr. B. W. Richardson, p. 249.)

ETHYLATE OF POTASSIUM.—*A New Caustic.*—The ethylates of potassium and sodium will probably be found to be the most effective and manageable of all caustics. They are crystalline substances, in which one atom of hydrogen of absolute alcohol is substituted by one of potassium or sodium. Brought into contact with the tissues they absorb water and are decomposed, the potassium or sodium is oxydised, and alcohol is reformed from the recombination of hydrogen derived from the water. (Dr. B. W. Richardson, p. 268.)

IODINE AS A DISINFECTANT.—Iodine is one of the readiest and best disinfectants. An aqueous solution forms an excellent application to ulcers and wounds. It is, however, most suitable of all for use within the sick bed. A little iodine in a box and covered with muslin, placed under the bedclothes, will keep the bed quite free from any offensive odour. (Dr. B. W. Richardson, p. 274.)

MECHANICAL DIVISION OF MERCURY.—With the mercury shake a very small quantity of tincture of tolu, and the former will be reduced rapidly to a state of minute division which is easily mixed with fatty and other ingredients. (Mr. J. Calvin, p. 271.)

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BEING

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EDITED BY

W. BRAITHWAITE, M.D.,

LATE LECTURER ON MIDWIFERY AND THE DISEASES OF WOMEN AND CHILDREN AT THE LEEDS SCHOOL OF MEDICINE, ETC.,

AND

JAMES BRAITHWAITE, M.D., LOND.

PART LXIII.....JULY.....1871.

UNIFORM AMERICAN EDITION.

NEW YORK:

PUBLISHED BY W. A. TOWNSEND.

1871.

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PRACTICAL MEDICINE.

DISEASES AFFECTING THE SYSTEM GENERALLY.

1.—THE CAUSATION OF SCARLATINA.

By Dr. ALFRED CARPENTER.

[The following facts which have been met with within the last eight years are very instructive, as bearing upon the etiology of scarlet fever. The general idea on this question is that only two factors are required to produce the disease, viz., the poison, and a certain condition of the system favouring its reception. The third factor so generally required in the production of zymotic diseases, viz., some defective sanitary condition, is not thought to have much effect in the production of cases of scarlatina, as it is found to occur in gentlemen's houses perfect in every detail of sanitary arrangement, as much as in houses of a poorer class. The writer's idea is, that blood decomposing under certain states is a factor in the causation of the disease.]

Observation 1.—The children of B. B., living in a well-ventilated house on a hill side, were all seized with scarlatina in the month of September, 1864. For three or four days previously the house had been pervaded with a most nauseous smell, which proceeded from some market gardens to windward of the house. The wind had blown very quietly from the same quarter all that time. The weather had been very hot, and was moderately dry. The miasms from the gardens below seemed to hang upon the crest of the hill. There was no scarlatina prevalent in the place, and there was no known communication with any other house in which scarlatina had occurred. The servants denied that they visited any infected houses, and the children had not been away from the hill for some time previously. Six cases occurred in that house, all commencing within forty-eight hours of each other. They were all mild in character, they ran the usual course, and each recovered in the ordinary time. The infection did not spread to others, the ordinary measures of isolation and disinfection being at once employed.

At the same time, and upon the same hill, and within the same forty-eight hours, two other families had children affected with the disease, of the like mild character, and with a similar result. The inmates of these houses were not known to each other, the children had not played together, the servants were not acquainted, they did not employ the same laundresses or the same milkmen, and scarcely the same tradesmen. Everything seemed arranged so as to make it conclusive that the miasms from the market gardens were the cause of the disease. These miasms were produced by slaughter-house refuse, with which the market gardens had been manured. The manure had been spread upon the ground as a top dressing, in dry weather, and had not been ploughed in, and at a time when there was a marked absence of ozone. Complaint was made to the local authority upon the subject. The epidemic ceased immediately the nuisance was removed by the manure being ploughed in; and no other cases, as far as could be ascertained, occurred at that place at that time.

Observation 2.—In the autumn of 1865, a nauseous sickening odour pervaded the neighbourhood of Park-hill and Croham, near to Croydon. This odour was traced to the application of slaughter-house manure to a field at Croham. This manure had been brought by railway from London,

and spread upon the soil for some time before it was ploughed into it. Four or five days afterwards cases of scarlatina occurred simultaneously in three large schools in that neighbourhood, several persons being attacked in each establishment. The first cases commenced in each school within three days of each other, whilst no known inter-communication—whether by milkman, laundress, or butcher—existed between them. One school consisted of about 120 children, belonging to the Society of Friends; the second was a girls' school, about two hundred yards from the first; and the third a boys' school, about a hundred yards further on. They were all situated on different lines of sewers; and there did not appear to be anything in common to account for the attacks of coincident illness. It could not be proved that scarlatina did not exist in the neighbourhood before the manure complained of was spread abroad. A few cases had been reported in the town before the outbreak; a good many also occurred afterwards. They were not fatal, and the epidemic did not extend to any poor neighbourhood.

Observation 3.—The end of 1862 and the beginning of 1863 were noted for the number of fatal cases of scarlatina which occurred mainly in a district north and west of the East Croydon Railway station-yard. Into that yard at that time much offensive manure used to be brought from the London markets, and from thence it was carted into the country, but the trucks sometimes used to remain some days before being removed. Public complaints were made to the local authority by the neighbours, and, after a time, the practice was discontinued. The death rate from scarlatina has never been so high in Croydon district as on that occasion, equalling 1·64 per 1000 of population living, and 9·69 per cent. of gross mortality. This coincidence may not be due to cause and effect, but it is suggestive when it is seen that the table land around the station-yard, especially that most open to its influence on the north-west, was the situation in which most of the fatal cases occurred, though this may also to some extent have been modified by the fact that at that time very little had been done for the perfect ventilation of the sewers; and it is possible, therefore, that the prime cause might have been more rapidly spread by them.

Observation 4.—The children of G. W., inhabiting a clean, well-ventilated house at Addiscombe, occasionally became subject one by one to scarlatina. The first origin of the disease was most clearly traced to a certain room occasionally used as a sleeping room. This apartment was placed over a fowl-house, which, on examination, was found to contain much bird excrement. It was also the place in which the fowls were killed, and therefore contained blood. It was noted that the cases occurred during or after very hot nights, and markedly when ozone was absent, as on Sept. 15th, 1865, when the last case arose. The sleeping-room smelt rather stuffy, and, although the ceiling between the fowl-house and the room above was a closed one, it was evident from the odour that miasm of some kind or other did arise, and find its way into the room. After each case the room had always been disinfected, and every care taken to remove contagion; but until the fowl-house was altered, and the guano removed, the occasional occurrence of cases took place. This alteration was made in 1865. Since that time, though the children in the family have increased in number by the addition of one each year, and the room almost continually slept in, no other case of scarlatina has occurred there.

Observation 5.—A large school existed in Croydon, which on several occasions had been broken up by reason of outbreaks of scarlatina. Eventually the master gave up the house, and it became disused for a time. It was then discovered that a very large cesspool under the children's playground had not been filled up when the privy was changed into a watercloset some years before. This cesspool seemed at times to receive the washings from a neighbouring slaughter-house, and doubtless some blood by the same means. This cesspool was filled in, and the slaughter-house had its connexion made more correctly with the sewer. The house has been inhabited again for several years by a large family—the gentleman,

head of the establishment, taking pupils; but scarlatina has not appeared there since.

Observation 6.—Scarlatina became suddenly very prevalent in the village of W—— W——, four miles from Croydon, in the autumn of 1865. The disease was not known to be prevalent in the neighbourhood. It began close to the only slaughter-house in the village, and from thence spread to nearly all the children in the place. It made its appearance soon after some cleansing operations had been performed, and a great stench had been set up in the neighbourhood. The origin of this outbreak has been inferred only, as there may have been previous infection, which had been spread by the children at the village school. It is believed, however, that the slaughter-house refuse had most to do with it.

Observation 7.—The village of S—— C——, near Sevenoaks, was in a similar manner severely visited by scarlatina in the autumn of last year. The writer has no personal knowledge of this case, but he is informed, on reliable authority, that the public well is in close proximity to the slaughter-house of the district; and it was proved by analysis that the water of that well was contaminated with blood products.

Observation 8.—The writer mentioned his suspicions regarding blood, decomposing under certain states, as a factor in the production of scarlatina, to a gentleman residing in the neighbourhood. Soon afterwards, as that person rode by a neighbour's house on the Surrey hills, he observed a quantity of blood and animal offal lying on a manure heap, near to his neighbour's dwelling. He spoke to the owner, and told him that his children would have scarlatina if that stuff was left there while they played about the yard. The man laughed at him, and said it was the place at which they had always deposited the offal from the animals killed there, and that no harm had ever arisen. This was during some hot days in June, 1869. Early in July one of his children died of scarlatina. There was none in the neighbourhood. The house was at some distance from any other, and it is not known that the children who were affected had caught it from any particular source.

Observation 9.—Seven boys occupying seven different chambers in a large public school were all affected with scarlatina within a short time of one another. It was concluded that a very large number in the school would necessarily be affected, as so many centres of infection seemed at once to exist. Most admirable measures were, however, taken by the school authorities to prevent the spread of contagion, and the anticipations were not realised; for no other cases occurred in that portion of the school. These boys were college boys, none of whom were allowed to go out of bounds, except on particular days, and then only when leave had been obtained to visit friends. The seven had, with many others, had such leave on one particular day. Scarlatina at that time prevailed in the town, and the child of a neighbouring butcher died that day. The butchers' shop had been most offensive during some preceding hot weather, and his slaughter-house was close to the confectioner's shop, around which the boys were accustomed to loiter. The authorities of the school did not make out any clear cause for the production of the disease from any other source. It appears to the writer that the sprinkling of cases thus appearing showed a source outside the school. The immediate removal of the affected to wards altogether away from the college prevented its spread among the healthy boys; and as no "leave-out" days occurred for some time, the immediate cause of the disease was removed before it could produce further mischief, and severe weather setting in stayed its further progress there.

I believe that scarlatina would be shorn of its fatal tendency if blood was not allowed to be shed in our towns and villages, except with certain precautions, so that none should enter our sewers; if our houses were built on proper foundations and well ventilated, and if pure water were always provided for the people; if sewers were so constructed as to be self-ventilating, and that continuously, and so arranged that the products of

excrement putrefaction could not possibly pollute the air of dwelling-houses.—*Lancet, Jan.* 28 *and Feb.* 4, 1871, *pp.* 111, 149.

2.—ON CONTAGIOUS DISEASES AND THE MEDIUM THROUGH WHICH THEY ARE PROPAGATED.

By Dr. WILLIAM F. WEST, Medical Officer to Rathmullan Dispensary, Ireland.

We may strongly presume that all contagious and infectious diseases are so through the medium of certain germs peculiar to each disease, for it is one of the proofs that a disease is contagious because others exposed to the infection are affected in exactly the same way as the patient they were supposed to take it from, modified of course to some extent by individual temperament or constitution, which goes to prove both the doctrine of Biogenesis, and also that it is through poisonous germs floating in the atmosphere that the disease is contagious. We mean by the doctrine of Biogenesis, that life is only produced from life, that is, from pre-existing living germs or organisms, as distinguished from the old idea that life might be produced from dead matter, as maggots were thought to be produced from the tissue of decomposing meat, whereas it is now known that the maggots are produced from eggs deposited in the meat by flies. The germs of disease floating in the atmosphere and entering the system of a healthy person, produce like phenomena to those seen in the patient from whom the disease was taken; and it is easy to conceive how a disease is infectious: thus, the poison germs of the disease are exhaled from the patient's lungs and skin, and impregnate the atmosphere around with them, so that any one in that atmosphere must necessarily breathe those germs, which enter through the thin wall of the capillary tubes of the lungs with the oxygen of the air, and through the delicate wall of the capillary blood-vessels ramifying in the air-vesicles into the circulation. The same doctrine of Biogenesis and atmospheric poison germs may also account for the various epidemics which often sweep over a line of country. Thus, certain poison germs at particular seasons of the year, generated in some way, perhaps from the eggs of insects deposited on the leaves of trees, and becoming detached as the leaves wither and dry up in Autumn, or from the decaying of vegetable matter (which latter is likely the cause of dysentery, the fevers, typhoid, typhus, intermittent, and very likely cholera and some other diseases, and thus accounts for Autumn being the season of the year at which these diseases are most prevalent, as at that time leaves of trees and many plants wither and decay), are resolved in fact into their component elements, and in the process disseminate poisonous germs which give rise to disease; these germs being taken into the atmosphere are carried by the wind over particular districts as is seen in some epidemics, which might be accounted for by the wind blowing in one given direction, or in other cases scattered irregularly over a large extent of country, which also might be accounted for by the wind shifting from one point to another, and thus scattering the poison germs over a wider range. Medical men have argued whether epidemical diseases are also contagious and infectious, but I think in the present advanced state of medical science, and considering the foregoing arguments, it is plain these epidemics are infectious and contagious, "if, indeed, we admit the latter word as being different from infectious, for although, of course, taking the literal meaning of the word from the Latin *con*, together, and *tango*, to touch, it is certainly different, signifying, in a medical point of view, that a disease is liable to be taken by another person from the act of touching a patient labouring under such disease; yet I think there is no disease liable to be propagated in this manner from one person to another, with the single exception of parasitical skin diseases, which *must of course* necessarily be so, as the spore or germ of the parasite is *transplanted* direct from the skin of a patient suffering from one of these

loathsome complaints to that of a healthy person, wherein it finds a genial soil natural to its habits, to grow and foster itself at the expense of the surrounding tissue which it modifies or destroys. I should also say, that the diseases of insects and perhaps some reptiles are very many of them contagious, owing to the fact that, from the peculiar constitution of their skins and bodies, when certain poison germs come in contact with them they penetrate through the external tissue, and passing into the viscera of the creature, grow at the expense of its blood and so destroy it." I say, there is good reason to believe that epidemics are infectious, because the poison germs in the atmosphere that first produced the disease are not lessened or destroyed by the fact that they are taken into the system of the persons attacked, no more than wheat or any other grain is lessened or destroyed by being cast into the ground in Spring, though it may disappear from the sack or bin, or whatever it may have been contained in, and be seen no more for a time, yet it is sure to spring up again to life, bearing an innumerable offspring to propagate the species still further; so the system of living animals receiving these poison germs acts as fit soil wherever they are nourished, grow, and generate others like themselves innumerable, and are thrown off and scattered through the surrounding atmosphere, (as the grain is thrown off and scattered on the earth, or as the seed from the lofty tree or the down from the thistle is carried and scattered by the wind hither and thither and deposited in a soil wherever it grows and bears fruit), and the atmosphere near a patient thus becomes highly infectious. But the objection is brought forward that a cholera epidemic is certainly not infectious. To that I would say the infection or non-infection of cholera is still an open question, as there can be arguments brought forward on both sides: for instance, there are plenty of examples of persons obliged to be in close proximity to patients suffering from cholera, who have been stricken down, while others farther off escaped; and I heard my father tell of a house in Jamaica, right opposite to which he lived in the same street during a cholera epidemic, in which house three whole families died one after another, so at last the house was thrown down to prevent any others from going into it, which shows that the cholera poison emanating from the persons of the first family suffering from the disease had infected the house to such a degree, as to render it a habitation of death to all who entered it. On the other hand, we have examples of people nursing and coming in contact with cholera patients, and also after they died, and yet these people never took the disease; I have heard of a Dr. Geohegan, who, in the last epidemic of cholera in Ireland, used to strip himself naked, and get into the bed of a cholera patient immediately after he died, and this he did five or six times to prove that cholera was not infectious; but I think this only proved that it was not contagious, and that there was no more danger from his doing that, than from walking in the room where the patients were; nor do I think such examples proof against the idea of its being infectious, for similar examples can be brought forward in the case of other diseases acknowledged on all hands to be most infectious, as typhus fever, scarlatina, small-pox, &c. For a disease to be infectious, it is not necessary that every one exposed to the danger should take it; if so it would be a pity for the poor doctors.

Some men, through a particularly strong and healthy constitution, have the power, to a great extent, of resisting the poison of the most contagious diseases, while others on the contrary, through a delicacy of constitution, are very liable to become victims to contagious poison. Again, through a peculiarity of constitution not depending simply on health or strength, some individuals have the power of resisting the poison of certain diseases, while they very easily succumb to that of others, just as some seeds will not grow well in certain soils, requiring a peculiar soil for themselves. In both the cases that I have mentioned, when such people are exposed to the infection of disease and yet escape any harm from it, I think even they may be infected by the poison, but through the healthy or peculiar condition of their blood, it *has the power* to resist those morbid changes which poison

germs floating in the vital fluid always have a tendency to produce; and such persons not struck down by the disease are said to have escaped the infection, when they may be really infected, and I would say they have resisted the infection. Again, people often think they have been exposed to infection when they really have not. Thus, they go into the room of a patient lying ill with fever, measles, or small-pox or other contagious disease just at the commencement of the malady, and it is well known that at the beginning of an infectious disease there is no poison given off from the patient, nor has it been ascertained at what particular time the poison commences first to be exhaled. It seems, "taking up my former simile," that some time must elapse for the poisonous seed to grow, generate, and ripen in the soil of the constitution before the pestilential harvest is reaped, and the grain is fully matured and exposed in the prostrate sheaves, the bodies of the victims ready to be taken to the charnel-house, the barn where human harvests are stored till the day when the Archangel's blast shall winnow like a fan the chaff and grain. A great many scientific men, however, consider that some of these contagious diseases are caused by poisonous gases emanating from the ground in wet marshy districts, or the effluvia from sewage matter, but there is good reason to believe that it is not merely a gas that is given off in these cases, like hydrogen, oxygen, nitrogen, sulphuretted hydrogen, or any simple gas, because it is easy to understand and it has been shown that living germs are mixed, or rather are floating through those gases given off from sewage matter. And in the same way with marshy grounds, there are vegetable germs given off with the gases, perniciously modified and changed by the process of decay which the vegetable matter has undergone or is undergoing, for the humidity of the soil itself will not produce any bad consequences, a good illustration of which we have in our Emerald isle in the large tracts of bog with which Ireland abounds, and which are always swampy, yet the moisture of these bogs never produces any disease. Why is this? The Irish peasant would answer because the isle has been blessed by St. Patrick, but a more scientific reasoner than poor simple Pat would say the cause is to be found in the fact that peat has preservative properties, and arrests the decay of any animal or vegetable matter which may be in it, and likely it may have decomposing properties also. But in ordinary soil which has not been blessed by the Saint, or has not these wholesome peculiarities, the water causes or at least increases the decay of vegetable matter, and there is one very strong proof that it is from the poison thus arising that cholera is generated, which is, that in cases where cholera has broken out among our soldiers and others in India and elsewhere, those sleeping on the ground or nearest to the ground in marshy districts, are most frequently attacked, and in houses those on the ground floor suffered most, and indeed, in some cases those on the upper stories escaped altogether, while those below were dying fast—as Watson quaintly expresses it, "the cholera poison loves the ground." From this idea, that the poisons which generate disease are produced from the dying of vegetable and animal matter, is suggested another idea which I think is true, that death generates or produces death, the death of the vegetable producing the death of the animal and that of the animal producing the death of others; a fearful example of which we now have before us on the continent of Europe, where disease and death are entering rapidly the ranks of the hostile forces, from the decomposition of the bodies of their slaughtered foes and comrades. The seeds of death were first sown in our globe, when our erring mother Eve plucked the forbidden fruit, and they have been growing since, and increasing every year, till now in our time the death harvest reaped by the sickles of the various diseases is something enormous. Of course we may say this is owing to the increased population of our earth, but certainly, if the harvest field has been enlarged, death has been equal to the increased labour, by employing an extra set of hands in the shape of new, and till lately unknown, maladies, and also seems to have *enlisted the passions* of men, and made their minds and intellectual powers *subservient to their* passions, for the purpose of inventing new machines to

more speedily destroy human life, just as mowing and reaping machines were invented more speedily to cut down the corn. The march of intellect, as it is called, has certainly made rapid strides in the art of destroying life. Has it advanced as rapidly in the art of preserving it? I think this rather a doubtful question.

All that has been said with regard to contagious diseases, also goes to prove the doctrine of Homogenesis, by which is meant that like is produced from like, as contradistinguished from the doctrine of Xenogenesis, which is, that parent germs may produce an offspring different from themselves; for which latter theory was brought forward the argument that worms of various kinds in the human body, and in cattle, were produced from the tissue of the body, and were yet dissimilar from it; but this argument was founded on a mistake, for the worms in the body of a man or beast are generated from eggs deposited in it, either by the drinking of bad water, or eating badly cooked or unwholesome food containing these eggs, so this argument only proves the doctrine of Homogenesis still further, the eggs of parents producing a similar offspring. Yet the doctrine of Xenogenesis is, I think, true to some extent, as we have numerous instances of heterologous growths on and in the body, which growths must be said to be an offspring from the normal tissue of which the body is composed, or as in the case of nut-galls, an offspring from the tissue of the tree, yet differing from the normal structure of both.

These growths must be the result of mechanical or vital conditions modifying the normal structure of the body, mechanical, as in the case of corns, bunions, &c., vital, as in the case of cancerous, fibrous, cystic, &c. There are also changes found in the blood itself, the result of some morbid condition acting on the vital fluid, as is seen in phthisis, where the quantity of fat that should be in the blood is deficient, and the white and red cells are imperfectly developed, a new product is then found in the blood called tubercle, the result of this morbid condition, and which seems to take the place of the fat cells, and so the blood is greatly changed, and also in some other diseases the blood is modified pathologically, as in rheumatism, gout, leucocythemia, &c. It is plain these changes are owing to internal conditions, and so we have Xenogenesis or a parent producing offspring different from itself, and it seems that all these diseases following this law are non-contagious, which is quite reasonable, and according to our former arguments, because *that* depending on an internal condition of the constitution cannot be transferred to another person where these conditions do not exist. So, I think none of these growths are contagious, not even cancerous tumours, which some medical men think are liable to be taken off another person, but if the pathology of cancer be true: that it depends on an internal condition of the blood, how can another take it whose blood is not in that state? and the fact that no matter how often you remove a cancerous tumour, it is liable to return in the same or some other place, goes far to prove that the disease depends upon some morbid condition of the blood itself.

Dr. Richardson objects to the germ theory on the grounds that the presence of the assumed germs is not proved, but I think he must acknowledge there are very great arguments in proof of their presence, and they have been actually demonstrated in the effluvia of sewage matter. 2. He objects that the specific character of each germ is not traceable in such malady. To this, the doctrine of Homogenesis affords an answer. 3. He objects that if the germs are reproductive and indestructible, the universe would become filled with them, which, as a media of disease would destroy the people. To this I would reply that the advocates of the germ theory do not assert that the germs are indestructible, but quite the contrary, on the idea of their destructibility found hopes of eradicating these diseases, or at least of preventing their further course when they break out, and also they are not reproductive, except when sown in the constitution of men, no more than wheat or any other grain is, except it be sown in the earth.—*Medical Press and Circular, Jan.* 18, 1871, *p.* 45.

3.—ON THE SULPHO-CARBOLATES AND THE ANTISEPTIC METHOD IN MEDICINE.

By Dr. A. Ernest Sansom, Physician to the Royal Hospital for Diseases of the Chest, City Road; and to the North Eastern Hospital for Children.

[Perhaps no subject possesses more interest at present than the "Germ Theory of Disease." Some consider that certain living organisms or germs are the actual causes of transmissible disease, and others consider that there is not a shadow of evidence to warrant this assumption.]

We know, however, of no organic substance which can induce a train of symptoms resembling in kind and in mode of sequence the phenomena of any infectious disease; still less any poison the fatal dose of which is so minute as to be imponderable and invisible. Furthermore, we are acquainted with no simply organic material which can be as we know the *materies morbi* to be, self-multiplying. If, then, the prime causes of disease be material organic particles, they must possess powers far transcending those with which we are ordinarily acquainted.

Some researches on forms of transmissible disease have contributed towards the elucidation of the question, particularly those of Beale and of Chauveau on vaccinia, variola, cattle-plague, &c. The researches of M. Chauveau have proved that the activity of the poisons of vaccinia, of glanders, and of sheep-pox, resides not in the fluids of the inocculated material, but in excessively minute elementary granules suspended in the fluid. He has shown, furthermore, by actual experiment, that this inoculable material may be communicated to a living body as well by the lungs and by the stomach as by insinuation beneath the skin. Dr Beale has shown that the elementary granules of vaccine are minute masses of living matter (bioplasm) manifesting very active movements. In cattle-plague he has observed similar rapidly multiplying material in the blood of the affected animal.

In the cases, therefore, of such transmissible diseases as I have mentioned, the term "germ" has different significations.

In diseases produced by entozoa or epizoa, it denotes the transmitted ova of the animalcula specially concerned.

In diseases due to vegetable parasites, it indicates the sporules or minute granules whence the parasitic vegetables develope.

In zymotic diseases, it indicates those minute morsels of germinal matter which possess a vitality separate and distinct from the organism into which they may become absorbed, and, once gaining entrance, develope and circulate within the fluids of the containing organism. The word "germ" then, denotes nothing more than the minutest portion of living material which the mind can conceive, such material being ultimately derived in various ways from the animal or from the vegetable kingdom.

From remote times measures have been adopted having for their object the prevention or the arrest of transmissible disease. These measures have been adopted with two objects: to prevent the communication of disease from person to person, and to prevent the evolution of noxious material from fermenting and putrefying matters which have been recognised as sources of contamination. The object of disinfecting measures has been the destruction of the virus in the one case and the prevention of its evolution in the other. Materials capable of fulfilling the desired ends are very various. Inorganic as well as organic substances of endless variety of chemical constitution are capable of being good disinfectants. On a review of a large number of these substances, and an examination of their relative power in arresting fermentation, putrefaction, and the proliferation of low organisms, one cannot help concluding that the chemical constitution or the chemical properties of a body can be no index of its position as a disinfectant or an antiseptic. They operate in no traceable chemical way; but, when they *kill the organisms* which accompany the fermentative or putrefactive process, *they arrest* all the phenomena of the process.

The question occurs. Is it possible to arrest the vitality of the germs of disease within the living body, as we have reason to believe we can destroy them when external to the body? Can there be an internal as well as an external antiseptic method? In the case of the higher forms of parasites which induce disease, this can be at once answered in the affirmative; and it affords a *prima facie* case for the elucidation of the question in reference to the more subtle zymotic diseases. It is certain that an agent which can be taken with impunity by the higher animals can be a powerful poison to the lowest forms of life. Many of the medicines ordinarily administered, as bichloride of mercury, arsenic, the salts of iron, &c., even in very high dilution, at once kill lowly endowed organisms.

In 1857, Professor Polli of Milan, having observed the power of sulphurous acid and the sulphites in arresting fermentative processes, initiated a plan of administering the latter in cases of zymotic disease. An able paper by Dr. Polli was read at the meeting of the British Medical Association in 1867 (see British Medical Journal, November 16th, 1867). The author did not consider that the sulphites, when internally administered, acted as poisons to morbific ferments, but that they rendered the components of the recipient organism incapable of being acted on by the catalytic germs. It is difficult to understand this hypothesis; for, whether the sulphites attack the germs directly, or whether they render the soil unsuitable for them, the ultimate result is their death. It is possible that Polli agreed with Bernard, who said, "We cannot neutralise these ferments in the living organism; it is impossible, because to effect such a purpose it would be necessary to interfere with the functions of the blood to such an extent that it would be incapable of maintaining life." This would be the case if the agent acted as a poison in virtue of its chemical properties; to oxidise or deoxidise the ferment would be to gravely interfere with the functions of the blood. But we find that the most feeble oxidisers or deodorisers are the most potent poisons to low organisms; the sulphite, which can be shown at once to kill myriads of animalculæ or fungi, can be shown to exercise scarcely any deoxidising power, for it is recoverable from the body not as sulphate, but as sulphite undecomposed. In my opinion, therefore, we should conclude that the action of the sulphite or any absorbed antiseptic would be the action of a poison upon germinal matter.

As to the success of Polli's treatment, there is discrepancy in the evidence. On the one side, many observers attested to much success. From 1861 to 1867, Polli received one hundred and forty-eight papers, which, with the exception of five or six, confirmed "in the strongest terms, by many hundreds of detailed observations, the value of the remedies." On the other hand, many who have employed them in this country have expressed themselves as disappointed with the results. From a review of the conditions, it can be at once seen that we have no right to expect from any treatment pursued with the object of arresting the course of septic poisoning, an uniformity of success. The opposing conditions are many and powerful. Common experience tells us that there may be the absorption of a morbid poison long before the manifestation of any subjective or objective symptoms, or these may be so light as to pass unnoticed. During this incubation, there can be little doubt that collateral physical degenerations are occurring in the tissues of the body. And when the symptoms of disease have set in, a variety of induced perturbations contribute to form their complex cause; so the induced condition may be of far greater gravity than the original. Thus the ova of certain tæniæ may exist in the human body unnoticed, but their development as echinococci induces the gravest lesion. In cholera, the exfoliation of epithelium from the gastro-intestinal tract is another example of secondary disintegration. There is, therefore, abundant reason for the discrepancy between different observers. Many have probably been discouraged by a want of success at the outset. The logical conclusions are, that the value of the plan can only be determined by numerical data, and that, if it be adopted, collateral measures, suited to the various complications, should be put in force as well.

The fulfilment of the plan of treatment by the sulphites does not involve the abandonment of a plan which has been proved to have a probability of success. Our present treatment of zymotic disease is manifestly expectant. The complications which arise can be treated in the one case as in the other; and by the sulphite the functions of a saline causing the reduction of a heightened temperature are fulfilled, and something more.

Since Professor Polli's first advocacy of the sulphites, I used them in the treatment of zymotic disease, and I considered that my results confirmed his own. I felt that in the path which he had indicated there was work to be done, and that an agent might be discovered having therapeutic powers perhaps exceeding those of the sulphites. Carbolic acid then came prominently before the medical world, and its powers as an antiseptic became daily more apparent. Certain difficulties attended the internal administration of itself and its simple salts; but in 1867, my attention was called by Mr. Crookes, F.R.S., to a salt which he had procured of a compound acid, sulphocarbolic, with potassium. I pushed the inquiry further, and procured the sulphocarbolates of most of the alkalis, alkaline earths, and metals, and endeavoured to study chemically and therapeutically their various characters. (See Obstetrical Transactions, 1868, p. 291; Medico-Chirurgical Transactions, 1869, p. 139; Practitioner, July, 1869, p. 5.)

The general mode which I have recommended for the preparation of salts is this: a definite sulphocarbolic acid is first formed by mixing 97 parts by weight of pure carbolic acid, liquefied by the aid of heat with 101 parts of strong sulphuric acid. Much heat is evolved, and a syrupy liquid results, which after a time becomes crystalline. Sulphocarbolic acid may, by slow crystallisation, be obtained in long colourless deliquescent needles. On neutralising the liquid sulphocarbolic acid with equivalent weight of the various bases, very beautiful regularly crystalline and stable salts are formed.

I.—Sulphocarbolates of Alkaline Bases.—Of these the sodium, potassium, and ammonium salts have been obtained. In testing their therapeutical characters, I have confined myself, for the sake of uniformity, to the sodium salt. The dose has been usually twenty to thirty grains three times a day to adults, though I have given as much as a drachm every four hours. At the North-Eastern Hospital for children, I have had abundant opportunities of testing the action of this salt in diseases of children. The patients coming from the most impoverished quarters of London, there are numerous examples of the various conditions of wasting disease. In cases of *thrush*, I have found the odium-growth to pass away much more quickly during the administration of sulphocarbolate of sodium than under any other plan of treatment, the sulphites not excepted. There has been during the present year a great prevalence of *stomatitis*—the occurrence of small circular ulcerations upon the tongue, gums, and internal surface of the cheeks. I have noticed a very strong relation subsisting between this condition and diarrhœa. In the diarrhœa which prevails at the present time, I have, on close inspection of the mouth, been able to detect in numerous instances cicatrices indicating that a condition of stomatitis has existed unnoticed. This fact may, I think, be of subsequent importance with reference to the consideration of the causation of diarrhœa. This condition of stomatitis has invariably, under the sulphocarbolate, disappeared from the third to the seventh day of treatment.

Follicular Inflammation and Ulceration of Tonsils.—I have administered the sulphocarbolate in eleven such cases, with the result of complete recovery in one case on the third day; in eight cases on the fourth day; two were not observed till the seventh day—they were then quite well. Several of these cases had previously had the same affection going its course to suppurative tonsillitis—in none of them was there a trace of suppuration. I should add that they were all cases accompanied by severe pyrexia.

Sloughing Ulceration.—In three cases of great severity, accompanied by *diphtheritic* signs, there was complete recovery without complications. *Convalescence* took place in one case on the seventh day; in another,

wherein the thermometer had registered 106 degrees Fahr., the child was able to walk on the fourteenth day; in the third, with severe pyrexia (temperature 105 degrees Fahr.), delirium, and large ashy slough over each tonsil, perfect power of swallowing returned on the sixth day, and progress was uninterrupted.

Scarlatina.—In eighteen cases in which the sulphocarbolate was administered, recovery was very rapid. The throat-signs became rapidly alleviated; it was an almost invariable rule that, at the end of the fourth day of treatment, all throat-distress had passed away. It should be added, that in all these cases not any local treatment to the throat whatever was practised, nor any other remedy save the sulphocarbolate. The pyrexia rapidly diminished. Complete convalescence took place in six cases in seven days; in one, in eleven; in one, in fourteen; in one, in fifteen days. The sequelæ were, in one case general anasarca resulting in recovery; in one, albuminuria for a single day; in one, abscess of a superficial gland in the neck; and, in one, a persistent slight glandular swelling.

Variola.—My experience of the remedy in this affection is very limited; but I think it is sufficient to induce an extended trial. I have used it in two cases; one of these was a gentleman of middle age, who made an excellent recovery. He had, however, been vaccinated, so the result could have but little weight. I have since, however, had a severe case in a child of one year and eight months, unvaccinated. The progress was uninterrupted, the pitting very slight, and complete convalescence took place at the end of the fourth week. In none of the zymotic cases thus treated did a death occur.

Enteric Fever.—I have not myself had any opportunity of using the sulphocarbolates in this disease. Dr. Ligertwood, of Newbury, has, however, put the plan in practice, and has forwarded me a tabular statement of twenty-four cases so treated. Dr. Ligertwood says: "I think the treatment was very successful. There did not seem to be the same tendency to relapse that I have found occur under other treatment. The diarrhœa, often very severe, never became so exhausting as to call for any special treatment, and the average duration of the fever was certainly not more than under the usual modes of treatment."

Tuberculosis.—In testing the therapeutic effects of sulphocarbolate of sodium upon phthisical patients at the Chest Hospital, where I first begun to employ it, I was so struck with the signs of general improvement that I determined to give it an extended trial in these cases. It must be remembered, however, that in most cases cod-liver oil was used in addition. In eleven cases of children showing signs of general tuberculosis, eight improved considerably; two seemed uninfluenced; and one went from bad to worse, the progress of tuberculisation being evidently unchecked. From notes of seventy-eight cases of pulmonary phthisis in which I employed it, the following are the results. *First Stage:* fifteen cases. In eleven much improvement, with marked decrease of symptoms and increase in nutrition. *Second Stage:* fifty-one cases. Thirty manifested much improvement; seven slight improvement; twelve uninfluenced; in two disease progressed rapidly. *Third Stage:* sixteen cases. Ten much improvement; twelve uninfluenced; in two disease progressed rapidly. I entirely leave the interpretation of these results.

II.—Sulphocarbolates of the Alkaline Earths.—The *magnesium* salt crystallises in large clear rhombic prisms. One of the most interesting of the whole series is the *calcium* salt. This is obtained in long, fine, delicate crystals, which, interlacing, somewhat resemble benzoic acid. It is exceedingly soluble; and this I consider to be a most valuable characteristic. The following expresses the solubility of calcium salts at 60 deg. Fahr.

Calcium carbonate	} insoluble.	
„ phosphate		
„ hydrate	1 part soluble in	800 of water.
„ *sulphate*	„	500 „
„ *sulphocarbolate.*	„	1 „

I thought that the calcium sulphocarbolate might prove useful in the treatment of rachitis. I accordingly employed it in twenty-six cases, with these results: great improvement in sixteen cases (of these there was, to all seeming, complete recovery in ten); moderate improvement in five; doubtful results in five.

In some of these cases cod-liver oil was administered in addition; but in many, in which there was the most marked improvement, the sulphocarbolate alone was given. The usual dose for children between the first and second year was five grains. I have also used the sulphocarbolate added to ordinary chalk-mixture in cases of chronic diarrhœa in unhealthy children, apparently with good result. Of the efficacy of the treatment in rachitic disease I think I am entitled to speak with some confidence.

III.—Sulphocarbolates of the Metals.—Of these I have obtained the iron, the copper, and the zinc salts, all of which present highly characteristic appearances. The zinc salt is in brilliant colourless right rhombic prisms; the copper salt possesses a blue colour, much resembling that of the sulphate. Mr. John Wood has employed these in lotions to prevent suppuration in wounds: he considers that they exercise an obvious control over the suppurative process. The only salt of the internal administration of which I have had any experience is the iron sulphocarbolate. This is a colourless very soluble salt, crystallising in rectangular plates. It assumes, in the presence of peroxide of iron, a deep mauve or purple tint. I employed it as a general tonic in diseases of debility in children; some cases of eczema and of impetigo became rapidly better under its influence, but I did not conclude that it was superior to the other salts of iron. In a case of enlarged and strumous glands, there was much amendment, and the swellings almost entirely disappeared. In ten cases of threatened tubercle there was considerable improvement in four; in the remainder it was doubtful. In cases of pulmonary tuberculosis there was much improvement in six cases; slight improvement in seven cases; no improvement in eight cases. I could state confidently that the results were not nearly so satisfactory as in the cases treated by the sodium salt.

In conclusion, I trust that these few imperfect observations will induce many of my professional brethren to test in actual practice the value of these interesting salts. Their place in therapeutics can in no sense be fixed by the experience of one individual. As to their mode of action, there may be very many who widely differ from me in the opinions which I have enunciated; but their physical characters alone will, I think, enable them to hold a useful place in our materia medica.—*British Medical Journal*, *Dec.* 24, 1870, *p.* 677.

4.—ON THE FEVERISH STATE.

By Dr. Lionel Beale, F.R.S., Physician to King's College Hospital.

Let us inquire into the nature of the changes which mark the feverish state, and endeavour to decide upon what principles our treatment of this common morbid condition should be based. Feverishness may be induced by many very different circumstances, and varies in intensity from a very slight derangement of the normal physiological changes, of little consequence, to a condition that must end fatally in the course of a few hours.

The invasion of almost every form of acute disease is marked by feverish symptoms; and there are not a few chronic diseases which are accompanied throughout their whole course by fever. Feverishness may be studied in the Surgical as well as in the Medical wards of the Hospital; and there is certainly not an individual in any civilised community, and probably not one even among savages, who has not experienced, at least in some degree, the phenomena of feverishness in his own organism. Nor are any warm-blooded animals exempt from fever. It is probable that even cold-blooded *vertebrata* suffer; and I could adduce evidence to show that some of the *changes* characteristic of fever may be induced even in the frog. Slugs

and snails and worms suffer some of the changes characteristic of the feverish state. Insects, probably owing to their organisation, cannot be feverish; and certainly the lowest animals and plants are free from any general morbid change allied to fever.

Now, the living organism which is the seat of a slight feverish attack, differs only from the perfectly healthy body in the fact of the accelerated rate at which some of the ordinary physiological actions are being carried on, and the reduced intensity of other constant processes.

The change may be very temporary, lasting, perhaps only for a few hours, and neither accompanied nor caused by any structural change in any tissues whatever. At first the blood alone is affected, and a little increased action of the lungs, skin, bowels, or kidneys may at once cut short the slight disturbance which has taken place in the circulating fluid, and which has occasioned the fever—so far a *functional derangement only*.

In very slight fever the heart beats more frequently than in the normal state, but it by no means follows that the blood is made to circulate more quickly through the capillaries of the tissues and organs of the body. On the contrary, there is evidence in many organs of impeded circulation, of obstruction to the free passage of the blood through the capillaries, of distension of their walls, and in some of accumulation of blood. Consequently, the animal heat is not carried off as fast as usual, and the temperature of the blood rises. At the same time there is in many parts of the body, even at an early period of the disease, an increased development of heat. The exalted temperature in fever is, indeed, due partly to the disturbance of the processes concerned in the *carrying away of heat*, and partly to the *increased activity of the heat-producing process*.

Less water is given off from the blood in the feverish than in the healthy state. The blood is, therefore, of lower specific gravity than in health. Many of the little arteries are dilated, and, the capillaries being distended, the blood flows through them more slowly, and undergoes less change as it flows than in perfect health. The pressure upon the vascular walls is increased. The feverish patient is even conscious of a *feeling* of fulness and distension in many parts of his body. The muscles seem tired; the skin is dry; the lips parched; and the mucous membranes less moist than they should be. All the excreting organs—the liver, the skin, the kidneys, and the bowels—work less actively than is their wont. Although the temperature of the body rises, there is a feeling of chilliness—perhaps actual shivering, as from cold—an instinctive desire for external warmth, yielding to which will, indeed, bring ease. A warm bed or a warm bath relieve all the unpleasant sensations accompanying a slight febrile attack in a very short time; but they recur if the external heat is removed before recovery has taken place.

The phenomena characteristic of the feverish state we are discussing, and some others, the consideration of which I have purposely omitted, are consequent upon changes in the blood. A perfectly healthy state of the blood and the feverish condition cannot coexist, and it is impossible for fever, even of the mildest degree, to occur without accompanying changes in the composition of the blood. Indeed, the blood-change is the starting-point of every feverish attack, and, if this be due to temporary disturbance only, the balance of opposing actions is soon restored by compensation, and health returns; but if it depend upon circumstances which cannot be quickly changed, the feverish state continues, and the degree of its intensity increases.

It has long been known that when fever, inflammation, and other blood diseases have become established, the composition of the blood is altered, and even in a slight feverish attack which constitutes an ordinary cold, the chemistry of the blood is temporarily deranged. The extractive matters soluble in boiling water are present in undue proportion, and it is probable that this increase arises from insufficient oxidation. Various matters, which in perfect health are very highly oxidised, so as to be eliminated in the form of carbonic acid, urea, and other substances which are readily

excreted, there is reason to think, remain in the blood imperfectly oxidised, or are very slowly and with difficulty eliminated in a suboxidised state. Thus there remains in the circulating fluid an excess of soluble material which permeates the tissues much more readily than ordinary healthy serum would do. This soluble matter transudes through the walls of many capillaries, and is appropriated by the bioplasm of the blood, of the vessels, and of the tissues, to their detriment. These very substances are susceptible of a higher degree of oxidation, and might have been oxidised and excreted as urea, carbonic acid, and other fully oxidised substances. The bioplasts or masses of germinal matter invariably increase in size in every form of fever. By this increased growth of germinal matter, which invariably takes place in all inflammations as well as fevers, the close analogy existing between these two classes of diseases is established.

One important change in the composition of the blood when fever has been induced, may be demonstrated in a very simple way. If the dried residue of the fever blood be extracted with boiling distilled water, it will be found that the proportion of matter dissolved out from the fever blood is much larger than that obtained from the healthy blood residue. Three specimens of blood taken from animals which died of the cattle-plague fever contained, respectively, 2·91, 2·22, and 1·81 parts of soluble matter dissolved out by boiling water, or twice the quantity extracted from healthy ox-blood. The exact amounts were as follows :—

	Healthy Ox-Blood.		Blood from Cattle Plague.		
	1.	2.	1.	2.	3.
Solid matter obtained by evaporating 100 parts of blood ..	19·87	20·63	23·1	22·78	24·88
Substances soluble in boiling water ..	1·33	1·11	2·91	2·22	1·81

The solid matter of the two healthy specimens contained, respectively, 6·69 and 5·38 per cent. of matters soluble in boiling water, while the diseased specimens contained, respectively, 12·62, 9·72, and 7·22 per cent. So that not only is the per-centage of the *solid matters* generally greatly increased in this form of fever, but the extractives and other substances soluble in boiling water are present in increased proportion. These substances probably constitute a pabulum, which is very readily appropriated by degraded forms of bioplasm.

On the other hand, it has been insisted upon by many—but upon purely theoretical grounds—that fever results from peroxidation. So far from this being so, it is certain that the feverish condition is from the very first associated with diminution in the activity of the oxidising processes. I even doubt if there is any evidence whatever in favour of the view that any morbid state known to us depends upon *too free oxidation*. I do not believe that hyperoxidation is possible. I doubt if we *can* oxidise ourselves too much. The greater number of our ailments—temporary and permanent, slight and severe, trivial and fatal—are unquestionably due to, and are associated with the very opposite condition—insufficient oxidation.

Although fever and inflammation are often considered as if they were very different conditions, the essential pathological phenomena are the same in both states, and a fever may be looked upon as a general inflammation, while an inflammation may be correctly regarded as a local fever. Fever may usher in a terrible inflammation, and a local inflammation may give rise to general fever. The minute changes which may be so readily demonstrated in ordinary inflammation, have much in common with those that take place in fever, but in the former condition the phenomena may attain a stage which in fever could not possibly be reached, for the simple reason that death would occur first. A part of the body may be destroyed by the growth and multiplication of the living matter, or bioplasm, until pus results, and although universal suppuration is, of course, impossible, we do actually meet with cases in which fever runs high and lasts long, and has actually led to suppuration over a great part of the body.—*Medical Times and Gazette, Feb.* 18, 1871, *p. 183.*

5.—ON A LOCALISED OUTBREAK OF TYPHOID FEVER IN ISLINGTON.

By Dr. EDWARD BALLARD, Medical Officer of Health for Islington.

[The outbreak of fever which forms the subject of this paper, occurred in July and August, 1870. Various suggestions were made as to its cause. Some thought it was owing to a new railway cutting, opening the mouths of a number of old drains and sewers, but the cutting extended in both directions far beyond the boundary of the invaded district, and yet no typhoid developed except in that district. Others thought it might be a dung-shoot in a yard, but this is overhung on three sides by dwellings occupied by labourers, yet in these not a single case of fever occurred.]

Another suggestion made to me proceeded primarily from a lady secondarily from her Medical attendant, to whom she expressed her idea. Fever occurred in this lady's family, and in four families of her acquaintance about the same time. She then called to mind that some little time previously she had changed her milkman, and, as ladies will do, had induced those friends of hers to adopt the same tradesman. *Ergo*, it was the milk. It happened that her Medical attendant, during the months of July and August, had several families of his *clientèle* down with typhoid, and, among the rest, the family of the very milkman whose wares were suspected. He wisely made some cautious inquiries, and found that out of eleven such families there were ten who were supplied from this source; the exceptional family resided a mile and a half off. Comparing notes with other private practitioners, the reality of a serious outbreak became obvious. Till then I had only heard of fatal cases, but now these other gentlemen began to make a similar inquiry, and there was such uniformity in the result that one after another communicated with me upon the subject. Altogether, private lists of cases were furnished to me by nine private practitioners in the neighbourhood, marking the families supplied by this milkman—some spontaneously, others immediately on my request. At first I confess I was sceptical; I thought I could satisfactorily account for the cases, without having recourse to what appeared a rather far-fetched theory; albeit, it became the favorite one with my medical friends, each, of course, guided by his individual experience. I thought, considering the limitation of the outbreak, and the probability that a milk-man in the neighbourhood would supply a great part of it, that after all, the association observed might be nothing more than a coincidence, strange and curious indeed, but of no scientific worth, and I did not hesitate to check gossip by saying so. When I add that now I not only believe that the distribution of milk from the dairy I have mentioned was the means of sowing typhoid in the district, but regard it as proved, it may be readily conceived that the evidence I have gathered is tolerably convincing.

The general result of an inquiry into the milk-supply of the families within the quarter mile radius into which I ascertained that typhoid fever had entered was this, viz.:—

That it occurred in the house of the milk-vendor, where the business was carried on; he died; and seven other persons, members of his family, or boys employed and living on the premises, had typhoid, and one of the latter died.

That it occurred in the family of a person who dwelt in a small cottage in the cowyard, distant about 100 yards from the last-mentioned house and dairy, three persons having fever here. The first case here was in a girl, who, a fortnight before she actually fell ill, had left a situation at a public-house supplied with milk from this dairy, and since then had been residing at home. This family, the mother of the girl told me, rarely took milk, except on Sundays, being poor: but when the girl was ill, milk was given to them from the dairy. The mother herself, and subsequently a little boy, had typhoid when the girl was convalescent.

That, in addition to the two boys who had lived in the house for a longer or shorter time, two men engaged in the business, who did not live in the

house, had typhoid. One of these was the cowman, engaged after the master was taken ill: the other was a young man who worked at the cowyard and carried out milk, and who took all his meals at a coffee shop supplied from the dairy, and where two families, also supplied from the dairy, had fever.

That a fifth man employed at the cowyard, and residing at home, had fever. He also occasionally had his meals at the above-mentioned coffee shop, and his tea at his mother's, who was supplied from the dairy. His family being poor, he bought no milk for them anywhere, and he was the only member of it attacked.

That another single man, residing within the radius in a wholesome house, and engaged as a coachman outside the radius, who habitually took his meals at this same coffee-house, had an attack of typhoid.

That (omitting the girl who came ill from the country), out of sixty-two other families within the district which are known to have suffered from typhoid, fifty-four, or fully 87 per cent., were constantly supplied from the dairy with the milk they required, two were occasional customers, and five only stated that they did not deal there at all. I am not quite sure that complete reliance can be placed on this last statement: certainly I doubt it in one case of the five. All five resided close to the dairy, and it is most probable obtained there, as the most convenient place, any extra milk their families required. In another instance, a girl was attacked in a family not supplied by the dairy, but it appeared that, on two consecutive days in the beginning of July, she had taken tea with a schoolfellow, who, with her mother, had typhoid a few days later, this family being supplied from the dairy. No one else in this girl's family had fever.

Confining myself now to the *fatal* cases happening in families who resided within the quarter mile radius (some of which individuals, however, were taken ill or died in the country), but excluding the girl who came ill from the country and died within the radius, I find that the total of such cases was twenty-five. Every one of the families in which these deaths occurred dealt for milk with the dairy in question—[I include here the deaths in his own household]—only one of them was an occasional customer.

Outside the radius, in the rest of the parish, I said I had fourteen fatal cases to account for. Five of these fourteen occurred in families supplied by this dairy—that is, more than a third of them. With such facts as these before me, I had a strong *prima facie* case against the milk; but, strong as it was, it did not absolutely exclude the idea of mere coincidence. I did not know how far the dairyman's connexion extended. I learned, however, that customers of his outside the radius, some at the distance of a mile or more, had been attacked with typhoid, and that several of them had died. What I had now to do, therefore, was to ascertain what families he actually did supply; with this information I should be able to determine the question decisively. Accordingly, I communicated to the father of the deceased dairyman the rumour which was freely canvassed both in the Profession and in the neighbourhood, and suggested that it would assist in settling the question if he would consent to furnish me with a list of his son's customers. It redounds greatly to his honour that he at once complied with my request, and expressed his desire to do everything in his power to assist in unravelling the mystery of the outbreak. I may say here, as the proper place for saying it, that he fully carried out his promise, and in doing so has earned not only my personal respect but the sympathy and respect of every right-minded person.

The result of my inquiry in this direction is that the members of 142 families were supplied with milk from the dairy in question. The district within the quarter mile radius alone must contain over 2000 families. So, after all, no very considerable proportion got their supply from this source. Out of these 142 families (which includes the dairyman's household), I have ascertained that 70 were invaded by typhoid within the ten weeks during *which the outbreak* extended—that is to say, half of them were invaded. *This includes* all the families which had deaths from typhoid. I did not

go from house to house to inquire among all the customers, so that it is quite possible that other non-fatal cases may have occurred in other families whose Medical attendants have not communicated with me. But this is enough for us. Inquiring as to the source of milk-supply in all the other instances of typhoid in the parish, during the same period, that came to my knowledge, I scarcely ever heard the name of any one milkman mentioned twice.

In these 70 families there happened altogether 175 cases, of which 30 were fatal—that is, the fatality was 17·1 per cent.

Again, taking the list of customers, I have gone through my mortuary records with it house by house, and I find that, besides the thirty deaths from typhoid which I knew of, there were altogether but three other deaths in these families—one was of an infant born prematurely (from what cause I could not ascertain), one was of a person who died suddenly with fatty degeneration of the heart, and the third was of an old lady, whose death is attributed on the certificate to "choleraic diarrhœa."

Probably, enough has been stated to satisfy you, as I am satisfied that the distribution of the typhoid was connected with the distribution of the milk from the particular dairy referred to. But, at the risk of being charged with heaping Ossa upon Pelion, I shall mention some other observations which add confirmation to the inference. They are interesting apart from this use of them.

1st. It is remarkable how the typhoid picked out, as it were, the customers of this dairy in particular streets and rows of houses. Thus, in one long road, and a street issuing from it, at a distance of a mile or more from the dairy, it supplied three families; of these, two had typhoid. It supplied two families in a street with about thirty houses; one suffered from typhoid; in the other died the old lady already mentioned from "choleraic diarrhœa." It supplied four families in a new neighbourhood with about seventy houses; three of these families had typhoid. It supplied four families in a crescent with twenty-five houses; all four had typhoid (in one only a single mild case occurred). It supplied four families in a row of nine houses; typhoid occurred in two of them, and, in the other two, cases of a mild febrile character (not enumerated) occurred. It supplied four families in two opposite rows of houses, altogether about sixty-seven; three of them had typhoid happen in them. It supplied four families in a square with fifty-nine houses; all four had cases of typhoid happen in them, &c. And these were, so far as I can ascertain, the only cases in these several localities.

2nd. It is to be observed that there were comparatively few solitary cases in the 70 families. Solitary attacks only happened in 22 of them; and these 22 include the three individuals who alone, of all the inhabitants of the same house, had the opportunity of getting their disease from the use of this particular milk. Of the 67 invaded families in which several members were exposed to the same risk, there were, then, only 17 in which solitary cases occurred. The attacks were multiple, then, in 75 per cent. In these families, the number of cases varied from 2 to 8 in a family, the average being a little over 3 cases per family. All will agree with me that this highly multiple character of the attacks in families is a feature not commonly met with except under circumstances where all the members of a family have been exposed to a common cause.

Still, it does not follow that where multiple attacks thus occurred every case in a family was due to the use of the milk and that alone. Probably in some instances the disease, being once introduced into the house and implanting there the contagion through the discharges, spread in the family and household, as it often does under such circumstances. This was very likely the case in some of those instances where an interval of two or three weeks elapsed between the first seizure in a house and the subsequent ones. In favour of this view I may state that in one instance in which typhoid contracted from this milk was developed in the country, it spread in the family and house to which the patient had migrated. In one instance a servant went to her *home in Islington* ill, and her father there was attacked.

have not been able to ascertain, although I have inquired, that a similar event happened in any other instance. But if this explanation held good to any great extent, we should have expected that the multiple character would have been as strongly marked in the domestic invasions occurring late in the outbreak as in those occurring early in it. On the contrary, however, as the invasions of houses supplied with this milk became delayed, so the multiple character of the domestic attacks became less marked. Thus—

			Total cases at intervals.
In the	1st week	9 houses were invaded	32 or 3·5 per house.
"	2nd "	16 " "	52 or 3·2 "
"	3rd "	13 " "	36 or 2·7 "
"	4th "	6 " "	17 or 2·8 "
"	5th "	6 " "	9 or 1·5 "
In subsequent weeks		18 " "	29 or 1·5 "
		68	175

There was, moreover, no instance within the quarter mile radius in which two families were attacked in the same house, except where both families used the same milk. On the other hand, there are several instances in which, more than one family residing in a house (the different families using milk from different purveyors), that using the milk from the dairy in question alone suffered.

3rd. The attacks in families appeared to have some relation to the quantity of milk consumed. It is a matter of common remark that milk is more largely consumed by females than by males, and by children than by adults. Now, leaving out the young children attacked in the families supplied from the dairy, and taking those over 10 years of age and the adults, I find that, while 97 females had the fever, only 44 males had it—that is, females formed nearly 69 per cent. of those attacked above 10 years of age. I am not aware that, under ordinary circumstances, typhoid shows any such remarkable preference for the female sex. Again, out of 47 families in which multiple attacks were observed and the date of the first case determined, it occurred—

In a woman over 20 years of age . .	20 times.
" child under 10 years of age . .	12 "
" girl between 10 and 20 years of age .	6 "
" man over 20 years of age . . .	6 "
" lad between 10 and 20 years of age .	3 "

The first attack in the house only occurred in a man or youth nine times out of forty-seven. Some curious illustrations of this relation came out under the inquiries instituted at individual houses. Thus, in the family living at the cowyard, the daughter, while engaged as a nurse in a situation, alone got the dairy milk with regularity, and she was first attacked: the second case in this house (her mother) was a month later. In a family consisting of the father and mother, who never took any milk at any time, two servants and four children all had typhoid, except the father and mother, the children commencing. In another family, consisting of mother, two servants, three girls, and a boy of 17, one of the girls and the boy took milk porridge daily at breakfast; the other girls, with the mother, took little milk comparatively. The servants, complaining that the beer was sour, asked permission to take milk instead of beer. The girl and boy who ate porridge and the two servants were alone attacked. In another family, where a daughter, aged 18 and a son aged 5 years were attacked, the daughter, I was told, was a great drinker of milk, and she was attacked a fortnight before the son. In a house occupied by several families, using one privy, and where the drain-smells from an overfilled cesspool were very offensive, only one elderly man and woman were attacked. They alone drank milk from the dairy; the other families, being poor, had never any milk at all, and altogether escaped. In another family, the only person attacked was a young girl,

who, being in delicate health, took more milk than all the rest of the family. Mr. Clifton also told me of a case of typhoid, which is not enumerated here, in the person of a young lady whose family was supplied by some other purveyor, but who fancied to drink daily a glass of milk from the dairy in question. No one else in the house ever took this milk, and she alone suffered.

I have very little more to add about the cause of the distribution of the disease. I have stated that miasmata of local origin played a part in the etiology of the outbreak. Such local miasmatic conditions were discovered in or about 23 out of 68 houses in which fever occurred in connexion with the use of this particular milk. This number is equivalent to 33 per cent. Now it is well worthy of remark that the houses thus conditioned were on the whole those attacked earliest in the outbreak among the customers of the dairy. Thus, of the 25 houses invaded in the first fortnight, 15 were thus circumstanced; of the 19 in the second, 7; of the 16 in the third, 1 was dirty and unwholesome; of the 8 at the later periods, all were free from local miasm.

There can be little doubt that although these unwholesome conditions proved of themselves insufficient to produce typhoid in the persons exposed to them, yet that such exposure imparted a disposition to suffer from the contagium introduced into the the system by the stomach.

These 23 houses had 83 cases amongst them; in only 2 of them were there solitary cases of fever. The average in the 21 multiple invasions is, then, 3·8 cases per house instead of 3 cases, as was averaged in the multiple invasions generally. And the fatal cases were 12—that is to say, the fatality under the combined influence of the milk and miasm was at the rate of 14·4 per cent.—which is lower than the average fatality. The inference being, that although the combination forced, as it were, an attack of typhoid on some individuals who probably would not have suffered from the milk alone, the attacks such individuals underwent were comparatively mild.

How did the typhoid contagion get into the milk? In considering this question we shall be considering the origin of the outbreak.

1. It is clear that it must have got into it either before it was sent out from the dairy or subsequently. The only probable way in which it could have got into the milk in its passage from the dairy to the customers is by the addition of foul water by the milk-carriers, in pursuance of a fraud upon their master. But against this supposition we have the fact that the young man who managed the dairy business—the master, indeed (who was one of the first fatally attacked) himself carried out the great part of the milk in a cart, and also the fact that the disease, even in the first week of the outbreak, was so widely sown as to preclude the idea of such a fraud having been perpetrated unless by general concert between the master and the men. Neither will it serve to explain the fact that the family of the dairyman was itself attacked very early in the outbreak. The milk that they got is not to be supposed thus fraudulently contaminated by a milk-carrier outside the premises.

2. But, besides sending out the milk furnished by his own cows, this dairyman often bought milk for sale from other sources. Sometimes, when the demand was greater than his supply, or when two or three of his cows ran dry, he bought considerably. Was this milk that he bought and served out to his customers together with his own that which contained the contagion? I inquired where the milk under such circumstances was obtained, and the answer was, from neighbouring cowkeepers, and several that I know were mentioned to me. This was quite sufficient to clear the purchased milk from suspicion; because, if that supplied from any one of these dairies had been the dangerous milk, I should have found the principal cases of typhoid in families supplied by that dairy. Now, as a matter of fact, in my inquiries throughout the parish into cases occurring during the whole ten weeks, I scarcely heard the name of any other dairyman mentioned twice.

3. If, then, we ask *where* the milk obtained the contagium it held, as a question preliminary to *how* it obtained it, the answer must be—Upon the premises of the dairyman. My investigation was now localised, and the question came to be—What possible sources of typhoid contagion existed upon the dairyman's premises? And now I must tell you something about their geography.

The cowhouse was situated on one side of a large open yard, communicating with a narrow lane, at the entrance of which were the stables and dwelling-house of a cab proprietor, into whose family, although supplied by the dairy with milk, typhoid did not enter. With this trifling exception there were no houses very near it; its neighborhood was mostly unoccupied land and gardens. The cowhouse formed part of a range of stable-buildings on one side of the yard. On the adjoining side was a row of buildings used as warehouses. The cowhouse was well paved and always kept clean. There was no drain but the surface one, which conducted liquid matters along a channel to the centre of the yard, where they entered a gully opening, and passed away into the drains. The stables were drained by pipes towards the same gully, the pipe being continued into a small sewer in the lane. The dung was stored against the wall of the stable. I have no record of any complaint being made at any time against these premises on the score of uncleanliness. They were always clean when I have seen them. Ten or eleven cows were kept here. At the time of the outbreak, and for a long time before, there had been no disease among them—they were a fine and valuable lot of cows. The young man who carried on the business up to the time of his illness milked them himself, and saw to their being properly kept. In the centre of the yard, the paving of which had, from the heavy traffic upon it, got a good deal out of repair, was a large heavy gully grating, which it was always believed was properly trapped, but which, on examination in the course of the inquiry, was found not to be so. Beneath it was a receiver about three feet deep, from which the drain passed. I perceived no offensive smell from it, nor can I hear of any one who ever noticed any; but on gauging it with a fork, a violent gush of offensive gas was evolved, almost explosively. On the side of the yard opposite the warehouses was a cottage of two rooms, occupied by one of the workmen, his wife, daughter, and little son. All but the man had fever. The daughter was taken ill the same day as the dairyman—namely, on July 9. This was the girl I have mentioned who had left a situation as nurse, where the milk in question was supplied a fortnight before her illness. Above the cottage was a large open iron tank of New River water. When I saw it, it was foul. It had no waste-pipe. It was used for the cows and horses, for washing vans, and for all domestic purposes by the occupants of the cottage.

The milk business, however, was not carried on here, but at premises about a hundred yards off, to which the milk was carried in the cans prior to distribution. I am assured that none of the water from the tank over the cottage was ever added to it.

The premises where the milk business was conducted consisted of dwelling-house, covered yard, stable, and offices. The arrangement of these is shown on plan (*see Med. T.*, p. 616). With respect to the stable, I must say that it was large, airy, admirably paved with iron bricks, and always very clean. It was provided with pipe drainage beneath, the channel entering an old brick drain (B), and with patent stable traps. Prior to the outbreak in these premises I am informed that some of these traps were broken, and that the smell was very offensive, and diffused into the yard beyond, especially when a closet, used by the workmen on the premises, which communicated with this drain at the further end of the stable was flushed. During the illness of the dairyman at this house, the new traps were put in, and I am informed there was no accumulation in the pipes. At the side of the stable was a cart-shed, and near its entrance a wooden and glass office, attached to which, on the outside, was a flap-table, above which, on the woodwork of the office, the cans used in the business were

hung up. The kitchen of the dwelling-house, projecting backwards, had a window looking upon this table. The water-closet was situated in a narrow strip of yard at the rear of the kitchen. There were two receptacles for water on these premises. One was a cistern situated in the back yard. It was closely and well covered, and when examined found to be scrupulously clean. The waste-pipe did not pass into a drain, but discharged upon the surface of the paved yard. From this cistern a pipe proceeded to a tap at the side, and a little below the level of the flap-table mentioned. The other was an underground tank, situated beneath the flag-stone paving of the office against which the flap-table was erected. The water was drawn from it by means of a pump situated at the entrance of the stable from the yard. I may mention for what the fact is worth, that this pump, although in view from the office, was not in view from the window of the kitchen looking upon the flap-table. This tank, like the cistern, was supplied from the mains of the New River Company. It was constructed about sixteen years ago, and during that time no examination had been made of it. It had, however, been opened occasionally when it became dry from fixing of the ball-cock. But the time had now arrived for a thorough examination of it to be made. This examination, however, from the absence of the occupier of the premises during the convalescence from his attack of fever, had to be delayed, and it was not thoroughly examined until the beginning of November. There was no objection to this delay, inasmuch as the death of the young man who carried on the business led to the trade being given up, the cows being sold off very shortly after his death, which took place on Aug. 12. I may mention here, again, for what it is worth, that only eight fresh houses amongst the customers of the dairy were invaded after this date, six of them in the fifteen days between the 12th and the 27th, and only two later.

We may ask, then, which of these two sets of premises—the cowhouse and yard, or the business premises where the milk was sold—furnished the contagium to the milk? To take the cowyard first, there were present as possible sources of typhoid effluvia the foul receiver in the centre of the open yard, and the foul water tank over the cottage. I think we may absolve the latter at once, inasmuch as it is improbable that water would have been added to the milk here while there was plenty at the place of business whither the milk was to be carried. With respect to the foul receiver in the yard, I should place little value on any objection to it as a probable source of contagium on the mere ground of offensive effluvia not being noticed, so long as it could be shown on independent grounds that typhoid fever had actually been contracted by any person or number of persons from exposure to its emanations, or that it was probable that the milk had been sufficiently exposed to the chance of absorbing the contagium proceeding from it. It seems to me that any emanations from the gully would, before reaching the cowhouse, have been too diluted to produce mischief in this way; while it is understood that the only other possible exposure it could have, would have been during the carriage of the milk through the open air near it. Was there, then, any independent evidence of the gully or receiver actually giving off typhoid contagium into the atmosphere of the yard? It was a yard in which a good deal of business was carried on. Horses were stabled there, vans were washed near the gully, &c. As a fact, people employed about this yard were attacked with fever. Thus, 1st, one of the earliest, if not the very earliest case, happened in the person of a boy who was a "useful" boy about both premises—in the stables and at the cowhouse and yard. He was so ill on July 3 that he was sent home to his mother, at Finchley, where he died of typhoid on July 25. 2nd. The dairyman himself, who personally milked and managed the cows, spending much of his time in the yard, was attacked early—namely, on July 9. 3rd. The young woman at the cottage in the yard was attacked the very same day. 4th. A man who worked in the yard habitually, chiefly about the stables there and on the business premises, washing vans in the yard, &c., but who had nothing to do with the cows or dairy business, was attacked with fever early—viz., on

July 7. 5th. Another young man, similarly occupied, was attacked on August 10. 6th, and lastly, a cowman, who came newly to work at the yard and to take the place of the master, who was ill, in milking and managing the cows, about the beginning of August, was taken ill with typhoid on August 27. But in none of these cases was the certainty or probability of the dairy milk having been taken excluded. It cannot be asserted with certainty that they got their fever from a contagium evolved into the atmosphere at the cowyard. In the first instance the boy lived on the business premises, and had his meals there, including breakfast and tea. In the second case the same observation holds good. In the third case the girl had certainly taken the milk habitually up to a period within that of the incubation of typhoid. In the fourth instance the man told me that he occasionally took his meals at the coffee house, or his tea at his mother's house, both supplied from the dairy. In the fifth case the young man habitually took his meals at the abovenamed coffee shop, and also sometimes carried out the milk. The sixth case alone can be supposed to have probably originated in the effluvia of the yard. This was the cowman, who boasted that he always got his milk pure, for that he drank half a pint every morning early while milking the cows, and that what he used at home with his family was taken from the cowhouse direct in a bottle. I may observe here that in this case the disease was confined to himself, no one else of his family or in the house getting typhoid. But, then, as he also carried out milk from the dairy he had the opportunity of quenching his thirst from the cans, whether he availed himself of it or not. He says he never drank any water on either of the premises, as "he does not like water." Throughout my inquiry I have met with no other case of typhoid among men engaged at the yard than those I have mentioned. It appears, therefore, to me that the evidence of typhoid emanations into the atmosphere of the yard fails to be satisfactory.

This being so, we fall back upon the business premises. Here I found two possible sources of typhoid contagium—viz., the offensive emanations from the stable drains and the underground water-tank which supplied the pump. The evidence of mischief from the former is as deficient as it was in the case of the emanations in the cowyard; none of the men exposed to them having had fever except those who had been in the way of drinking the milk. And there is this additional fact, that the family most constantly and thoroughly exposed to these emanations escaped—namely, that of the horse-keeper, who actually lived over the stable, and the staircase leading to whose rooms was erected over a closet (not supplied with water) used by the workmen on the premises.

It will be observed that, step by step, my inquiry has become narrowed by the process of exclusion—the only one as it appears to me, applicable in such an investigation as this. And so I have arrived at the *underground tank*. About this for some weeks I could learn nothing but that it was a wooden tank, constructed sixteen years ago, of three-inch pine bound with iron, and puddled at the bottom with about nine inches of clay. Awaiting the time when the tank could be opened for inspection, I forwarded samples of the water for analysis to Dr. Bernays. I did not expect much to come of this, since the outbreak was then nearly over, and an analysis made in September of water which was daily undergoing replenishment would probably give very different results from an analysis made in June or July, when it might have been somehow contaminated; and the result of the analysis confirmed my expectation. It was in all respects similar to the results of analysis of the New River Company's water, as published by the Registrar-General and by Dr. Letheby—that is to say, it exhibited no special character that would indicate an unusual departure from the average purity of that water.

It was not until the return of the family from the country that I could get the tank exposed; and what found was this:—The description given me of *the tank* was correct; but the woodwork had become rotten, and at one *corner towards the cart-s*[illegible]oken down to the depth, from the edge,

of about eight to ten inches, forming a considerable gap in that side of the tank. (c) Between the part of the tank where this gap existed and the adjoining wall (distant about twelve inches), the earth, present everywhere else between them, was wanting, a conical hole being formed to the depth of about two feet. At the bottom of this hole, on letting down a candle, I noticed a rounded, smooth shoot with a wet clay bottom, inclining towards the cart-shed, and, on introducing my hand, I was convinced that it was a rat burrow. A stone was raised in the direction of the cart-shed, a hole dug, and the burrow was again reached, and found to cross above a stone-ware pipe leading from the water-closet towards the stable. Fortunately, at this moment the water was turned on from the main. It rapidly filled the tank, which overflowed at the gap; the water ran into the hole dug outside, and filled it to the level of about four inches above the burrow. It then ceased to rise any more, and on carrying my hand round this level, I found another burrow, by which, evidently, the water was running off. On the flow by the supply-pipe ceasing, the water sank rapidly to the level of the lower burrow, and was seen running away by that also. It sank no lower for a long time. The inference I drew was that by these burrows the water was very freely conducted away into some drain or cesspool. On taking up the pavement of the yard and exploring, three old and imperfect brick drains of various sizes were discovered, into one of which the pipe from the water-closet had been carried. The other two were disused, but one of them contained some wet slush; the other, containing only a quantity of dry deposit, could not have been the conduit for the overflowing water. In making these excavations, the burrows were necessarily trodden in, but the soil was found saturated with wet up to the brick drain in the stable that the water-closet pipe ran into, and up to the old drain at a lower level that contained the wet slush. With the exception of the drain which received the water-closet pipe drain, these old drains were disused, and evidently had been disused for many years. I have marked the situation of all three upon the plan. From the appearance of the soil along the dotted lines, there is every reason to believe that it was in their direction, or by some diverging burrows, that the water ran away into the two drains marked A and B. With respect to the old drain A, it is believed that it was once an overflow drain running into an old cesspool or ditch which is known to have once existed outside these premises, and the remains of which, beneath a collection of old oyster-shells, were discovered about June last in laying down a pipe-drain, D, for the drainage of some neighboring houses. Prior to the laying down of this drain, the stable brick drain, B, ran straight along into an old sewer; but when, D, a six-inch pipe was laid in, it was thought right to connect the brick drain, B, with it, the owner intending at some future time to do away with B, and carry the pipe from the water-closet into D.

This being the condition of affairs, it is evident that the underground tank was, by these rat-burrows, in communication with two old drains; and it is scarcely necessary to point out that, where rats could pass and water rapidly flow away, foul gases from the drains could pass, and must have passed, to the tank. Moreover, any accidental or temporary arrest of the flow of sewage from the brick drain, B,—such for instance, as may have occurred at the time of the alterations of the drainage of the adjoining houses—must, at the time the water flowed from the main into the tank, have filled up the drains and rat-burrows and the hole between the tank and the wall, and have caused an overflow of sewage into the tank at the gap. Either such an accident or the completion of the burrows to the tank, or the incursion of a rat carrying foul matters with him, might serve to account for the suddenness of the outbreak, supposing this water to have been used habitually for addition to the milk. However this may have been, we have here a fouled water-tank, the addition of the contents of which to milk distributed in the neighbourhood would be sufficient to account for the communication of typhoid fever to those who used it.

Is there, then, any *reason to believe* that this water was ever added to the milk, *or that the water alone ever* produced typhoid? I was assured by the

men about the premises that none of them ever drank this water; it was understood generally on the establishment that it was provided for the horses, for washing the cans, and for cleaning purposes generally. I only met with one boy who drank of it, and he used it at his dinner, and whenever he was thirsty. He had fever; but then at that time he was living upon the premises, and had his meals there, with the usual quantity of milk at his breakfast and tea. He was there for a week at the beginning of August, and was taken ill on or about August 14, after he had returned to his mother's house. This boy agreed with the other men in saying that he had never seen anybody else drink from the pump. The family of the deceased dairyman also informed me that at no time was the pump used for the addition of water to the milk; "if ever any was added, it was from the tap." Certainly the tap was the more conveniently situated for this purpose, close on the right side, and a little below the flap-table. So far as their knowledge extended, I have every reason to give credit to this statement, which, moreover, has been confirmed to me independently by several of the men employed. But then it was added that those of the family I inquired of had little or nothing to do with the milk business, which was entirely under the management of the young man who died; and it is to be recollected that persons in this trade are very much dependent upon the honesty of their servants, and that the pump, although in full view of the office when occupied, was not in full view of the window in the house which looked upon this part of the yard. And in connexion with the hypothesis that contaminated water had on some occasions been added to the milk by some one is a fact communicated to me that one family while suffering from typhoid discontinued the use of the milk "because it had a bad taste, and was disagreeable;" and another person asserts that "she had several times complained to the dairyman himself that the milk when kept became stinking, not (as she said) merely sour, and also of its poorness." This, if true, must have been prior to July 9. We are dealing now with probabilities, and one point to be weighed in estimating them is the fact that the dairyman and his household were among the very first attacked with the fever. Did they use milk diluted with this water in their family? Probably they were not very particular. But, supposing that it is absolutely true that no water from the pump was purposely added by any one to the milk, we have yet left the admitted fact that the cans were washed at the pump. Is it probable that the small quantity of foul water left in them after this process would suffice to contaminate the whole bulk of milk subsequently introduced? I confess that, to my mind, this is not an impossibility. We all know how small, almost infinitesimal, an admixture of sewage will poison a well or running stream; nor is the idea of reproduction of the typhoid contagium out of, within, or in the presence of an appropriate organic material at all foreign to the prevailing opinions upon the subject. Future experience may show that milk, which has remarkable relations to chemical ferments, is a substance peculiarly adapted also to the reproduction of morbid contagia, or to the contagium of typhoid in particular. Nor do we know even now how minute a quantity of contagium is sufficient to introduce the disease into any individual. Scarlet fever has recently been shown by Dr. Bell, of St. Andrews, to have been conveyed by milk to the customers of a cowkeeper in that place, the cows having been milked by persons convalescent from the disease. I claim now to have shown, what I have long suspected to be probable, that typhoid fever may be similarly conveyed by milk. Whether I have also correctly referred the contamination of the milk in this case to its source in contaminated water, others are better judges than myself. At all events, I have spared myself no labour in the investigation, which, if it has resulted in nothing else, has demonstrated one of the dangers connected with the mode in which the trade in milk is conducted in this metropolis.—*Medical Times and Gazette, Nov.* 26, 1870, *p.* 612.

6.—THE ADMINISTRATION OF SULPHUROUS ACID IN TYPHOID FEVER.

By Dr. G. WILKS, Ashford, Kent.

[In the summer of 1869 a great number of cases of typhoid fever occurred in Ashford, at first sporadically, and after a time in greater numbers. The diarrhœa was profuse, and exhausted the patients so much that it was absolutely necessary to control it. For this purpose the ordinary astringents in use completely failed, and Dr. Wilks tried creosote. This seemed to be beneficial, but nauseated so much that it had to be given up, and one patient, the only fatal case, attributed his approaching death to this drug.]

The first patient upon whom I tried it was a daughter of the gentleman who had attributed his death to the creosote. She was very ill before I saw her—alarmingly prostrate both in body and mind, vomiting and purging, with the abdomen tympanitic and painful to the touch, and distinct gurgling about the ileo-cæcal valve on palpation. The pulse was 120, and very feeble; the temperature 103 deg. With some fear as to the issue of the case, I began to administer the sulphurous acid freely. After twelve hours, I saw her again. The vomiting had ceased; the purging was fast abating; the tympanitic was much reduced; the feeble pulse had *not* grown feebler; but the parched tongue was moister, and the thirst less. She said that the medicine, each time she took it, relieved her within a few minutes of the indescribably miserable feeling in her bowels, and of the nausea which had before oppressed her. She could now take the nourishment ordered without fear or retching; and the whole aspect of the case, from the first a severe one, was more hopeful. To cut a long story short, she recovered, though she had entirely resigned all hopes.

Plentiful opportunities for using the acid came to hand; and the more we tried it, the better we liked it, and the more firmly we became convinced of its efficacy. This summer we have used the acid in more than a hundred and seventy cases with signal results; of them all, one only died, and he was an habitual drunkard, and would not take his medicine. In one case only did we withhold the acid; the patient, a female, died. But the circumstances were exceptional, and probably more to blame for the death than the want of sulphurous acid was.

I will now quote from my note-book a few of the more remarkable cases.

Case 1.—Mary W., aged 73, almost a pauper, had been ill a fortnight, and confined to bed three days. She had vomiting and purging, with yellow blood-streaked fluid stools. The abdomen was tympanitic. She was unconscious, save when strongly roused. Pulse 130, fluttering; respiration 30. The tongue was white at the edges, brown in the centre, and dry as a chip. The diagnosis was easy, for the rash was developed. The prognosis was very unfavourable: but she took the acid, and has since married.

Case 2.—Annie P., aged 4, was the child of wretchedly poor parents. Her mother, far advanced in pregnancy, was herself suffering from the fever in a mild form. This child had been ill in bed for ten days, and was, it was thought, moribund when I was sent for. She was continuously delirious, purging incessantly, so that the whole house stank of her offensive motions. The rash was copious; the pulse uncountable; the tympanitis extreme; the vomiting so persistent that the attendants had for hours ceased to give her food. Could any case in itself, and in all its collateral circumstances, be more unpromising? With the utmost difficulty, and by dint of the sternest resolution, I forced the grandmother, who nursed the two patients, to give the child the medicine regularly, and feed it every ten minutes. For four days it lay seemingly at the very point of death, so that every time I entered the house I was taunted with harassing the last moments of a dying child. She took the medicine, and recovered.

Case 3.—Annie F., aged 2, an only child of poor but not poverty-stricken parents, had all the above mentioned symptoms. You will doubtless agree with me that an only child *is* a more troublesome patient than one of a more

numerous family; yet this child too recovered under sulphurous acid treatment.

Case 4.—Edith M., aged 8 months, the child of well-to-do tradespeople, did not have the rash, but the vomiting, purging, and all the other symptoms, as badly as any case; but she too recovered.

Case 5.—Thomas H., aged 54, a well-to-do mechanic, had been under the hands of a skilful medical man for some weeks with such symptoms as I have before described; but so often as the diarrhœa was checked, the burning heat and vomiting were greatly increased, and *vice versa*, till at last he was told he could not live the night, and was beyond human help. He then sent for me. When I saw him, I found him in a state of most alarming prostration. His pulse was too fast and feeble to be counted. He had vomiting: the abdomen was tympanitic; and he had purging, the bowels having acted thirty-four times in the last twenty hours. I could not discover any rash; but his state was such as to preclude any very searching examination. I prescribed the acid. In the next sixteen hours his bowels acted twice; he was not once sick. He recovered. This case seems to me to say volumes for this medicine, for there is no doubt that the man had taken all the drugs ordinarily used without deriving permanent benefit or arresting the disease; and yet from the moment he swallowed the first dose of sulphurous acid he began a recovery in which he never faltered afterwards.

The acid should be given in doses of from two and a half to twenty minims, according to age, repeated every four hours, and continued for a week, ten days, or even more, until the patient complains of tasting, smelling, or feeling like sulphur or lucifer matches; or, in the case of infants, until they actually emit an odour of the gas from their skin and breath. I have never pressed its use beyond this, under the belief that the system must by that time be supersaturated; nor have I ever seen reason to regret stopping it at that point.

Where I have seen the case early, before the diarrhœa has become severe, I have given simply the sulphurous acid flavoured with syrup of orange-peel in water. Where the diarrhœa was troublesome, I have added sulphuric acid and laudanum, according to the age of the patients. Thus my usual formulæ for adults have been the following.

℞. Acidi sulphurosi ʒ jj; syrupi aurantii ʒ iij; aquam ad ʒ vj; or

℞. Acidi sulphurosi ʒ ij; acidi sulphurici diluti ʒ ij; tincturæ opii ♏ xx; syrupi aurantii ʒ iij; aquam ad ℥ vj.

For infants:

℞. Acidi sulphurosi ♏ xv; syrupi aurantii ʒ iij; aquam ad ℥ j; or

℞. Acidi sulphurosi ♏ xv; acidi sulphurici diluti ♏ xv; tincturæ opii ♏ ij; syrupi aurantii ʒ iv; aquam ad ℥ j.

A sixth part of either of these mixtures is to be taken every four hours.

In one case only can I recollect diarrhœa *setting in* during the sulphurous acid treatment, and without having previously existed; but the patient had old standing renal disease, from which she still suffers, though she has almost forgotten fever.

Lest I should be misunderstood, I will state distinctly what I claim for the sulphurous acid in typhoid fever; that it arrests the further development of the fever-poison, and, by continuing this arrest long enough, exterminates the fever. Briefly, it is an antidote.

In some of my early cases, I left off the acid after a few days use, because the patients seemed better. In almost all such cases, they had a relapse, which was again immediately arrested by the resumption of the acid.

I believe that, where we get the cases soon enough, we may stamp out the disease then and there. For instance, in one thirty-six hours I was sent for to see four children belonging to two different families visiting in the town. I had no doubt as to what their symptoms denoted, and at once gave the acid. At my visit next morning, I was met in each house with smiling faces and the assurance that I had been mistaken in my diagnosis, for the little patients were much better. Of these children, three remained under my care, took the acid for a week, and made complete recoveries, without

relapse. The fourth seemed to ail so little that the parents would not heed my advice, but carried her home after two days of the acid. Shortly afterwards, I learned that, three days after reaching home, she had been attacked by typhoid fever, and hardly escaped with life. I make no doubt that, had the other three also discontinued the acid as soon as they seemed well, they too would have had a return of all their symptoms, and have suffered the ordinary course of typhoid fever.

Very possibly I have failed to convince you of the advantages of using this drug; but let me again remind you of the plain fact that, of one hundred and seventy-three cases of this fever occurring in our practice during the past fourteen months, two only died, and those two did not take the acid; for the one it was not prescribed; the other was a drunkard, and would take nothing. Of the hundred and seventy-one who took sulphurous acid, not one lost his life; and there were but few who were not convalescent within fifteen days of commencing the treatment. Surely such a result will induce you to try the medicine for yourselves when opportunity offers.—*British Medical Journal, Dec.* 3, 1870, *p.* 599.

7.—REPORT ON DISINFECTION WITH EARTH, &c.—EARTH CLOSETS.

The disinfecting power of earth has been known from the earliest time; in fact, the burial of the dead and the putting of unclean things into the ground are examples of its use from the remotest antiquity. In the ordonnances of Moses, which were written for the guidance of the Israelites, specific instructions are given for the disposal of the blood of slaughtered animals, by pouring it on the ground, and of "that which cometh from thee," by putting it into the earth and covering it therewith, so that the camp may be clean and holy; and again, the custom in China of mixing earth or fat marl with human excrements, and so forming them into a portable and odourless manure is of very ancient date. It is somewhat surprising, therefore, that among all the inventions in this country for the disposal of human excreta, there have been none, until recently, for the disinfection and consolidation of them by means of common earth. Rosser, in 1837, obtained a patent for the treatment of fæcal substances, urine, and house refuse with herbaceous plants and common earth, to which were added unslaked lime, soot, powdered gypsum, &c. Twenty years later, the Rev. W. R. Bowditch, one of the vicars of Wakefield, who had been studying the absorbent action of clay in the impurities of coal-gas, recommended, in the *Journal of the Agricultural Society* for 1858, that dry pounded clay should be put into a chamber or cistern above the closets of houses, and distributed over the fæces, &c., by means of some mechanical contrivance to be worked by a handle, there being a water-tight box below, which could be moved away and emptied when necessary. About the same time the Rev. H. Moule, who is the vicar of Fordington, in Dorsetshire, had practically tested the deodorising power of earth on privy soil; for having abolished the cesspools of his house, on account of their unwholesome and offensive nature, he substituted small buckets, which were placed beneath the privy seats, and these were emptied daily into a trench in his garden, where the foul matters were immediately covered with earth. He soon noticed that when the trench was re-opened the matters from the closet had not only lost their offensive odour, but had actually disappeared by a process of disintegration. This led him to the experiment of putting earth into the buckets, and of drying the contents in a covered shed. After working in this manner with about a load of earth, and redrying it, he found it was so perfectly inoffensive that he could use it over and over again, at least a dozen times in succession, and thus he produced a valuable manure, containing about one-third of its weight *of dried excrement.* The next part of his inquiry was devoted *to the mechanical process of* supplying the dry earth to the closet instead

of water; and in the month of May, 1860, he obtained a patent, in conjunction with Mr. James Bannehr, for "improvements in the nature and construction of closets and commodes for the reception and removal of excrementitious and other offensive matter, and in the manufacture of manure therefrom"—his claim being for the use of dry earth, clay, loam, or peat, powdered and sifted, and applied to the excrementitious matter by means of certain mechanical contrivances, so as to substitute a dry closet or commode for a water-closet, the earth, &c., being repeatedly used in this manner after it had been properly dried. Since that time a number of patents have been taken out for improvements in the machinery of the apparatus, the best form of it being that which is used by the Earth-closet Company and patented by their engineer, Mr Girdlestone.

Experience has shown that the quality and condition of the earth employed in the closets have much to do with the success of the process, for pure or nearly pure sand has deodorising power; and the same is the case with chalk, and other forms of carbonate of lime. Peat also, although rather more effective than sand or chalk, is not a good deodoriser; whereas clay, or earth which is rich in clay, is well suited for the purpose. The degree of dryness is also a matter of considerable importance, as it seriously affects the absorbent power of the material—hence the necessity for selecting a heavy soil, like brickearth, which is loaded with clay, and then drying it by artificial means, in order that it may be powdered and sifted for the purpose of utilizing its absorbent action to the fullest extent.

As to the quantity of earth required on each occasion, it appears, from observation and experiment, that a pound and a half of dry earth is sufficient for each solid evacuation (amounting to from four to five ounces in weight), and the same quantity for each liquid discharge (amounting to six fluid ounces in bulk). Practically, indeed, it is found that 4½ lbs. of dry earth per head per day is sufficient for all purposes, and in illustration of this a few working examples may be given. In the Dorset County Gaol at Dorchester, where the inmates are all adults, three pounds of earth are used per head daily, but the product is wet and offensive, showing that the quantity of earth is not enough for the proper consolidation and deodorisation of the excreta; whereas, at the Dorset County School in the same town, with eighty-three boys, a ton of artificially dried earth is used in the four closets weekly. This is at the rate of 4 lbs. per head daily, and it forms a solid inoffensive compost. At the villages of Halton and Aston Clinton, on the estate of Baron Rothschild, near Wendover, in Buckinghamshire, there are fifty-five well-managed earth closets, of good construction. These accommodate about 300 people, and during the last four years they have been supplied with dry earth at the rate of 130 tons a year, which is in the proportion of rather less than 2¾ lbs. per head daily, but the closets do not receive the whole of the day urine. In Lancaster also, where there are 90 earth latrines with 200 seats, accommodating 2250 persons, belonging to 450 houses, the quantity of earth used is 14 tons a week, which is a little less than 2 lbs. per head a day; but, as in the last case, a good deal of the urine is not discharged into the latrines. Again, at the volunteer camp at Wimbledon, the experience of the earth system is particularly instructive, for there are 114 latrines fitted up with earth closets in the most complete manner, and 41 urinals with earth-pits for the absorption of the urine. All the contrivances have been arranged by Mr. Girdlestone, the engineer of the Earth-closet Company, and they have been kept in good working order. Dr. Buchanan has ascertained, from careful inquiry at the camp, that during the meeting of the volunteers, which lasts for fourteen days, as many as 3000 persons use the closets daily, and 10,000 the urinals. In the course of that time 140 tons of dry earth are expended in the closets and urinals, the closets requiring 4500 lbs. per day, and the urinals 17,900 lbs. This is in the proportion of 1·5 lb. of earth for each operation at the closets, and 1·79 lb. for each visit to the urinals. When the earth was dry and of good quality it was found that the product was solid and inoffensive; but when, as in the preceding year (1867), it was of a peaty nature, the compost was wet

and sour. Taking these facts into consideration. Dr. Buchanan concludes that 4½ lbs. of dry earth would be a proper supply for each person daily, 1½ lbs. being allowed for each visit to the closet or urinal, and three such visits daily. A village of 1000 inhabitants would, therefore, require 4500 lbs., or just two tons of dry earth per diem.

The method of using the earth will necessarily vary according to circumstances. At Lancaster, where the latrines are under the superintendance of the local authorities, the earth is thrown into the closets in one application daily, or it may be supplied by a scoop after each operation, as at the Dorset County Gaol; or, better still, by proper contrivances for ensuring a regulated delivery of earth, as in the patent earth-closet or commode of the company; and the foul earth may be removed from the pit or vessel at any convenient time up to two or three months. After its removal it may be again dried and returned to the closet, until it has become charged with materials of manurial value.

The importance of this arrangement in a sanitary point of view is considerable, especially in warm climates, where the desiccation of the earth is easily effected. This has been clearly established in India, where the system has been rapidly extended.

The cost of working the system has been carefully computed by Dr. Buchanan, who says that in a village of a thousand people it would be £260 a year, and that the value of the manure (say 720 tons at 10s. per ton) would be £360, supposing that the earth had been used only once; but if employed four times over, the annual outlay would be reduced to £244, and the product, amounting to 200 tons a year, would, at £3 a ton, the price at Dorchester, and the estimated value of it by Mr. James, the agent of Baron Rothschild, realise £600 a year. Even at the approximate value of 10s. per head of the population, it would be worth £500; and this, he thinks, would be a profitable return, helping to pay the cost of other sanitary work. In fact, the advantages of the system, as summarised by him, are as follows:—

"1. The earth closet, intelligently managed, furnishes a means of disposing of excrement without nuisance, and apparently without detriment to health.

"2. In communities, the earth closet system requires to be managed by the authority of the place, and will pay at least the expenses of its management.

"3. In the poorer classes of houses, where supervision of any closet arrangements is indispensable, the adoption of the earth system offers especial advantages.

"4. The earth system of excrement removal does not supersede the necessity for an independent means of removing slops, rain water, and soil water.

"5. The limits of application of the earth system in the future cannot be stated. In existing towns, favourably arranged for access to the closets, the system might at once be applied to populations of 10,000 persons.

"6. Compared with the water-closet, the earth-closet has these advantages:—It is cheaper in original cost; it requires less repair; it is not injured by frost; it is not damaged by improper substances being thrown down it; and it very greatly reduces the quantity of water required by each household.

"7. As regards the application of excrement to the land, the advantages of the earth system are these:—The whole agricultural value of the excrement is retained; the resulting manure is in a state in which it can be kept, carried about, and applied to crops with facility; there is no need for restricting its use to any particular area, nor for using it at times when, agriculturally, it is worthless, and it can be applied with advantage to a great variety, if not all, crops and soils."

On the other hand, the chief objections to its use are—the notion of its filthiness as contrasted with the cleanliness of the water-closet, and the difficulty of supplying the necessary quantity of dry earth, and of removing the foul compost. *The advocates*, in fact, of the present water-closet system

assert that water is a vehicle which will carry the filth, by the natural power of gravitation, to any place where it is wanted; and that it carries it more cleanly, more cheaply, and more immediately than can be done by any organisation of man and horse and cart. "The manure which must be collected from town privies by an army of scavengers, and distributed from the depôt by barge and rail, to be afterwards loaded in carts and spread abroad by hand, and covered by the plough, might, if water were the carrier, be virtually self-borne to the very place where it is wanted,—taken almost direct from the water-closet to the field, and there washed in at once with really no labour at all among the very roots of the plants it is to feed." But all this assumes the total absence of inconvenience and danger from misadventure of the soil between the closet and the field, and it assumes, moreover, that the ground is always ready to receive it and the growing crop to appropriate it,—that there will, in fact, be no escape of noxious effluvium into the air, or of foul matters into the earth or into the neighbouring watercourses. Experience, however, has shown that these assumptions are never realised in practice, and that the greatest difficulties of the water-closet system are created by the very circumstances which are thus assumed to be non-existent,—that the vehicle itself, which is said to be so admirable a servant, is really a tyrannical master, defying all our efforts to control it; and hence there are many large towns already sewered which will not accept this vehicle notwithstanding its plausible show of convenience.—*Medical Press and Circular, Feb.* 15, 1871, *p.* 131.

8.—AN ANALYSIS OF 800 CASES OF SMALL-POX, OBSERVED DURING THE PRESENT EPIDEMIC IN THE HAMPSTEAD SMALL-POX HOSPITAL.

By Dr. Grieve, Medical Director to the Hospital.

[The 800 cases were admitted between the 1st of December, 1870, and the 18th of February, 1871. It must be borne in mind that the cases were selected from amongst a number of milder cases, and that the mortality was consequently rather high.]

As to vaccination. Of the 800, 591 were vaccinated and 209 were not. Amongst the vaccinated are included only those upon whose arms some kind of marks could be distinguished. And this large ratio of unvaccinated cases may help to account for the high general mortality. When we come to examine the relative proportions of vaccinated to unvaccinated admitted at different ages, the result tends to shake one's belief in the commonly accepted doctrine that liability to small-pox decreases with advancing age. While under ten years of age the unvaccinated admitted are to the vaccinated as 2 to 1, between ten and twenty the proportion is more than reversed, and the vaccinated are as 4 to 1 to the unvaccinated, which becomes 5 to 1 between twenty and forty, and 9 to 1 over forty years of age. The number of unvaccinated shows a regular diminution in advancing periods: below ten there were 103 admitted; between ten and twenty, 46; between twenty and forty, 56; over forty, 4. I believe that very few unvaccinated people reach forty without having had an attack of small-pox, and that this accounts for the diminished mortality amongst adults to the number living; and this view is borne out by an account published the other day of the results of a visitation in search of unvaccinated persons in St. George's-in-the-East. The report says: "The numbers of persons discovered unvaccinated in the course of the visitation were as follows: 589 under three years of age, 168 between three and fourteen years of age, and 10 adults." From this it would seem either that vaccination has been much more neglected during the last three years than in the preceding eleven; or, more likely, the last epidemic of small-pox has had something to do with thinning *the ranks of* the unprotected.

If in the census which is to be taken soon the fact of being vaccinated or unvaccinated were stated concerning each individual, the result would be a large amount of valuable information. But a good deal might be done towards elucidating this point by medical men who are in the habit of examining recruits for the army or police force. It is needless for me, I hope, in an assembly chiefly composed of medical men, to express my firm conviction and belief in the powerful effect exercised by vaccination over subsequent small-pox. I conceive its benefit is shown in three ways: it lessens the liability to take small-pox; it reduces the consequent mortality; and it modifies it even when it does occur, so as to change it from one of the most loathsome and fatal of all the zymotic diseases (as assuredly it was before Jenner's discovery) into a comparatively mild and harmless attack. And even when a fatal result ensues in a vaccinated case, as certainly frequently happens, the cause lies as much in some constitutional deficiency as in the disease itself, and the outward manifestations are never as severe as in the unvaccinated. One very marked difference is in the size of the pustule, which, I may say, is almost invariable. In the unvaccinated you have a large, round, flattened pustule; in the vaccinated you have a smaller acuminated one. These figures prove the foregoing assertions as to mortality: of 591 vaccinated cases, 58 have died, being a percentage of 9·8; of the 209 unvaccinated, 96 have succumbed, a percentage of 45·8. The difference is perceptible enough. Now, as to the severity of the disease. In vaccinated cases it has been found necessary to detain on an average twenty-four days in the hospital; unvaccinated have to be kept thirty-five days.

Does the effect of vaccination wear off? The Registrar-General, acting upon the supposition the fallacy of which in one way I have shown before, answers this question in the negative; but the experience of these 800 cases teaches differently. He, in treating of this question, took the gross mortality, both vaccinated and unvaccinated, at different ages, and so made his deductions. The great fatality amongst the unvaccinated is in infants, and so the gross mortality in infants is raised; but take the vaccinated separately, and we find under ten years of age it is $9\frac{4}{5}$ per cent.; between ten and twenty, $2\frac{4}{5}$ per cent.; between twenty and forty, $12\frac{2}{5}$ per cent.; and over forty, $22\frac{1}{4}$ per cent. There is an apparent contradiction here, when we have a larger percentage under ten years of age than between ten and twenty; but all engaged in practice know that in very young infants, in all disorders, complications carry them off; and that really a great part of the mortality in these cases may be put down to bronchitis, teething, &c. From twenty onwards the percentage of deaths amongst the vaccinated increases steadily. To go safely to work, then, revaccination ought to be performed somewhere about the age of puberty. The value of revaccination as a complete preventive against small-pox has been proved by Mr. Marson's experience at the Small-pox Hospital; and as far as ours goes at Hampstead it confirms it. We have sixty officials connected with the hospital, who are constantly in contact with the sick; and in the three months we have been open not a single case has occurred amongst them. A curious thing also is, that of the 800 cases under discussion to-night not one could prove that he or she had been revaccinated; while we had two suffering from a second attack of small-pox.

A noticeable feature in the class of people attacked is, that for a considerable time the number of men sent to the hospital by far outnumbered the women and children. Now we have many applications for the latter; the men, who, among the working classes, from their more active habits, are more likely to come casually in contact with the disease, have evidently taken it home, and from them their wives and families have been affected.

The number of our patients who are in occupations bringing them in contact with the public, such as barmaids, shop men and women, 'bus and cab-drivers, &c., shows that, to prevent a contagious disease from spreading, nothing less than compulsory isolation while the contagious power remains is sufficient.

There are other points connected with these cases which I may have an opportunity of bringing before your notice when the epidemic is over, and more leisure to give to their notation than there is at present. I will read the numbers admitted, at the different ages, of vaccinated and unvaccinated, and the mortality and percentage during those periods:—

There were 800 cases admitted between the 1st December, 1870, and the 18th February, 1871.

	No. Admitted.	Deaths.	Percentage.
Under 10 years, vaccinated ..	51 ..	5 ..	9·8
Ditto unvaccinated ..	103 ..	54 ..	52·4
Between 10 and 20, vaccinated ..	211 ..	6 ..	2·8
Ditto unvaccinated .	46 ..	13 ..	28·2
Between 20 and 40, vaccinated ..	289 ..	38 ..	12·7
Ditto unvaccinated .	56 ..	26 ..	46.42
Over 40, vaccinated	40 ..	9 ..	22·5
Ditto unvaccinated	4 ..	3 ..	75
	800 ..	154 ..	19·25
Total vaccinated ..	591 ..	58 ..	9·8
„ unvaccinated ..	209 ..	96 ..	45·8

—*Lancet, March* 18, 1871, *p.* 371.

9.—ON THE TREATMENT OF BLOOD-POISONING BY A CARBOLIZED ATMOSPHERE ACTING THROUGH THE SKIN AND LUNGS.

By JOHN WOOD, Esq., Surgeon to King's College Hospital.

[For some time back Mr. Wood has used at King's College Hospital, in cases of pyæmic and erysipelatous blood-poisoning, and also as a prophylatic agent after operations, the vapour of carbolic acid evolved constantly under and retained by the bed-coverings. The vapour thus remains sufficiently long in contact with the patient's body for absorption to take place into the system.]

For the purpose indicated, I employ the powder known as Macdougall's disinfecting powder. This is placed in small muslin bags to a considerable extent previous to the dust, and wholly so to the vapour which is emitted. These are suspended from the ribs of the cradle, which is almost universally used to keep off the weight of the bed-clothes, or to swing the limb, in surgical cases. Where these are not used, the small bags placed on the bed near and around the wound are quite as effective. I have never yet found in any case the presence of the dust to be complained of as irritating to the skin of the patient, and I have used them, as the subjoined cases will show, with the best results in severe cases of traumatic erysipelas. I also employ the powder, freely spread under and around the bed, in all putrefying and infectious cases, and the floors are washed with a solution of the common carbolic acid, so as to pervade the atmosphere very sensibly.

As regards the effect upon the wound itself, it seems to do all that is ordinarily necessary to keep the parts totally free from putrescence or smell of an offensive kind, when large sloughs are not actually present, and the wound very putrescent. When such are present I have usually used, in addition, the carbolic oil, of the strength of one part in six or eight, as a direct application, so as to saturate the sloughing part. In doing so, care is taken to avoid contact of the oil with the surrounding skin or with healthy granulations, upon which it has invariably the effect of retarding development and cicatrization. The perfect freedom of the beds, even in the worst cases, from smell and offensiveness is very remarkable, and this *alone cannot* but be beneficial to the patient's condition, and adds to his *power of resisting* septic influences.

In one case of undoubted pyæmic infection after operation, the effect of the absorption of the acid was evident both in the breath and in the urine. The latter presented for the space of a week a characteristic slate-coloured film and deposit. Some of this was collected and analysed, and was stated to be a modification of the colouring matter of the urine, and to be, in fact, identical with the ordinary blue indigo, and probably formed by transformation of the yellow indigo of the excretion. Since that time I have observed that a similar sediment has been observed in other cases subjected to the action of carbolic acid.

In the adjoined cases this appearance has not been observed in the urine. I have selected them as being fair specimens of a recent accession of erysipelatous and pyæmic cases in our hospital; and as having had the advantage of careful temperature observations made by Messrs. Whitmore and Rope, the house-surgeons; and also as having the carbolic vapour treatment perseveringly carried out throughout.

The two cases of *erysipelas* were as severe as any which I have ever seen recover. The stimulating plan was fully carried out, and due justice must be rendered to it and to the administration of the tincture of the perchloride of iron, although the latter did not form a principal part of the plan of treatment. The carbolic vapour did not seem to irritate the erysipelatous inflammation, which pursued in every respect its usual course of spreading, vesication, and consecutive abscess. The advantages which this method of application afforded in these cases were to leave the stomach free to the other remedies, to permit a complete freedom of escape of the pus and sloughs from the wounds, and their treatment by more soothing applications; while, at the same time, the benefits of the carbolic antiseptic action were fully obtained, as proved by the complete absence of putrefaction or any unpleasant smell whatever throughout the whole progress of the cases.

The case of *pyæmia* is remarkable for the distinctly marked and well-connected history of a previous threatening of a similar attack after a wound of the foot, probably resulting in some damage to the knee-joint at that time; and also for the *complete and rapid recovery* of the patient, with a stiff knee-joint, after the *total necrosis and removal of the patella* through a free opening for the evacuation of the pyæmic abscess of the joint. I have not been able, up to the present time, to discover a record of such an occurrence, nor to find it in the experience or remembrance of any of my pathological friends.—*Practitioner, Jan.*, 1871, *p.* 1.

10.—OBSERVATIONS ON THE INFLUENCE OF EPIDEMICS OF FEVER IN CHECKING THE ADVANCE OF THOSE OF CHOLERA.

By Robert Lawson, Esq., Inspector-General of Hospitals.

Though much has been said and written in support of different opinions as to the means by which epidemics of cholera were diffused, comparatively little attention has been paid to the courses these pursued, or to the causes which seem to have influenced their progress from time to time, and to have ultimately turned each into the particular track which it followed. It is obvious that, as the acquaintance with the natural history of the disease increases, the application of the theories so eagerly supported at present by many epidemiologists will be narrowed more and more, and a point will ultimately be reached where, with a knowledge of causes as yet little heeded, rational explanations may be given of much that now seems unaccountable. The object of this communication is to contribute to the attainment of so desirable an end, by directing attention to a characteristic feature in the relations of fever to cholera.

While investigating the course of pandemic waves, I became aware of the influence epidemics of fever exercise in checking the advance of those of cholera, and *vice versa*. Fever has frequently prevailed over an extensive area, and though

cholera, also embracing a large area, approached the other, yet, while the fever continued, epidemic cholera, as an epidemic, has never penetrated the fever field. Sporadic cases of cholera have frequently been met with a long way within the boundary of the fever field, and similarly cases of fever within that of cholera, but still the fact remains that, though the fever and cholera fields approached each other, neither disease took the place of the other until its force as an epidemic was broken. This fact sanctions the inference that the conditions which generate fever epidemics are not only different from those which produce epidemics of cholera, but are also incompatible with them; and further, that sometimes the one set of conditions, sometimes the other, exists over a large area of the earth's surface, and that the one will give way to the other without any marked change in the habits or circumstances of the population these areas embrace. The importance, therefore, of rightly estimating the influence exercised by one of these diseases over the diffusion of the other is obvious.

In the following relation, I have given briefly, the course of cholera epidemics from India northwards, from 1818, and have placed in a parallel column the epidemics of febrile disease which were met with in their vicinity about the same time. The information available on these points is but too often fragmentary and incomplete, and does not show in all cases, the close limitation of the cholera fields by those occupied by fever, but, as far as the evidence goes, it bears out the general fact in every instance, that where fever prevailed there cholera did not penetrate. In particularising the various epidemics mentioned below, I have employed the principles detailed in the Papers on Pandemic Waves in the Sanitary Reports for the Army for 1864 and 1866, and refer the reader to the map accompanying the latter communication for further information thereon:—

In 1817, 1819, and 1821, fever was particularly severe in Cutch and Guzerat, and northwards towards Rajpootana; it was frequent also in the intermediate years. There was much fever in the Mediterranean stations in 1818 and 1819, plague in the former year in Morocco, and in the latter at Constantinople. Whether Persia and Asia Minor were embraced in this influence, which was manifest at Cutch to the south-east, and Constantinople to the north-west, I have no evidence; but as the febrific influence was then strongly developed throughout the Mediterranean, it most likely embraced the countries between these points as well. Be that as it may, however, epidemic cholera failed to penetrate this district.

In 1820 and 1821, fever was still prevalent in Cutch and Guzerat. In 1821, it was very severe among the troops in Ionian Islands, and continued in the western part of Mediterranean, but I have no notice of its prevalence in Egypt, Syria, or Asia Minor. In 1822, there was a great increase of fever among the troops at Malta. In the Ionian islands fever was less severe than in 1821, but still high.

In 1818, a cholerific wave passed the isoclinal, 30° N., and there was a severe epidemic of cholera in Northern India, which continued into 1819, but it did not extend across, or even so far as the Indus, in either year. In 1819 this wave would pass the isoclinal 53° N.; there is no further information, however, regarding the prevalence of cholera in its epidemic form; but in the Mediterranean military stations, in 1819, and more especially in 1820, there were indications of its influence in the form of common, or sporadic cholera.

In 1820, another cholerific wave passed the isoclinal, 30° N., and the disease, in its epidemic form prevailed extensively in Northern India in China, and passed the Indus into Beloochistan. It continued very active in Northern India in 1821, and spread along the Persian Gulf, and through Persia, as far as Yezd and Bagdad, or to about 34° N. In 1822 the epidemic resumed its activity, and extended to Diarbekir in lat. 38°, and approached the Mediterranean as far as Aintab and Aleppo. This

In 1823, the causes of fever were not active at either Gibraltar or Malta, but in the Ionian Islands the deaths from it among the troops were 40 per cent. higher than in 1822, the first indication in this neighbourhood of a severe and extensive outbreak of febrile disease, met with this year at Sierra Leone and Ascension, and which, in 1824, was manifested in greatly augmented ratios of mortality from fever at Gibraltar and Malta, by very severe plague in Egypt, plague in the Morea, Monte Negro, at Constantinople and Erzeroum; thus completely encircling the district in which epidemic cholera had shown itself, though the milder forms were still experienced far beyond it.

In 1826, there was a considerable increase in the mortality from fever among the troops in the Ionian Islands, which became still higher in the following year. In 1826, plague was severe at Constantinople, and in 1827 had included Odessa in its range. There was also much fever in Western Europe these two years.

In 1828, febrile disease was particularly severe throughout the Mediterranean, and plague raged in Egypt, Syria, Greece, Constantinople, and in the Danubian Provinces, and continued to affect these countries, and embraced Odessa the following year. In 1830, plague prevailed from Bassorah to Aleppo along the Euphrates, also in Egypt and Syria. The mortality among the troops in the Ionian Islands was as high as the previous year, and petechial typhus raged in the kingdom of Naples. There being no notices of the prevalence of fever over the western coasts of the Black Sea this year, it most probably had diminished considerably, coincident with the advance of cholera westward. I have no information as to the prevalence of fever through Europe in 1831, but, according to Muchison, typhus was prevalent in London that year, as also in Scotland,

wave would pass the isoclinal 53° N., in 1821, but, although cholera did not become epidemic anywhere in the zone to the north of it, this or the following year, the cholerific influence was still very manifest in the Mediterranean military stations.

In 1822, another cholerific wave entered the zone between the isoclinals 30° and 50° N. This year the epidemic was not quite so active in Northern India as the previous one; it was severe in the north of Persia, apparently under the preceding wave, but early in 1823 it commenced there again, and, it is said, extended as far north as Astrachan and Orenburg in the course of the year; at the same time, it advanced from Aleppo westward, and reached Latakia and Antioch, and extended along the Mediterranean, between Scanderoon and Seleucia, where it seems to have stopped.

In 1826, another cholerific wave passed the isoclinal 30° N., and the epidemic disease prevailed in Northern India and China. In 1827 this wave passed beyond the isoclinal 53° N., and the epidemic affected Tartary extensively, but did not advance westward into Europe, though the cholerific influence was still marked among the troops in the Mediterranean.

In 1828, the succeeding cholerific wave passed the isoclinal 30° N., and cholera was very severe in Northern India. In 1829 this wave passed into the zone beyond the isoclinal 53° N., and in August the epidemic broke out in great force at Orenburg, and about the same time, at Tabriz, Tiflis, and in the northern parts of Persia, and it prevailed among the Tartar tribes to the north of the Persian frontier. In 1830, the second year of the wave in this zone, the epidemic extended westward of the Caspian and Volga, and embraced Russia as far as Moscow and Kazan, and in 1831, Poland, south shore of the Baltic, Hamburg, North of England, and even Iceland.

and the mortality among the Dragoons and Infantry of the Line, from fever, was much higher than usual.

In 1830, as mentioned above, plague prevailed in Egypt and Syria, and, consequently, though these countries are in the same zone as Northern India, cholera did not appear in them in 1830, the first year of this wave in the zone, but was delayed until 1831, the second year, when the plague had greatly diminished. The mortality from fever was considerably higher among the troops at Malta and Gibraltar in1831 than the preceding or following years, though, in the Ionian Islands, it was little more than half what it was in 1830. The deaths from fever among the troops on the home station were all much reduced in 1832; this disease was less prevalent among the population in London this year, too, though it was still active in Ireland and Scotland, and also among the troops in Canada.

In 1832, plague was prevalent at Bassora, Bagdad, Mecca, and other places in the Arabian Gulph. I have no information as to whether it was in Egypt. In 1833, there was a large increase of mortality, from fever, among the troops in the Ionian Islands, and a considerable rise at Malta, and in 1834, the ratio in the former was sustained, and that at Malta was again much increased, while plague was rife in Egypt, Tripoli, and at Constantinople. At Gibraltar, the deaths from fever were much diminished in 1834. I have no evidence regarding Morocco in either year. In 1833, there was a sensible increase in the mortality from fever among the troops in the West Indies, and in Jamaica, though diminishing, it was still high.

It was mentioned above that, in 1834, plague prevailed at Constantinople, Egypt, and on the coast of Barbary, as far as Tripoli, while fevers were common among the troops in the Ionian Islands and Malta. In 1835, plague continued very severe in Egypt. Pernicious fever was rife at Athens, though there was less fever at Gibraltar, Malta, and the Ionian Islands. In 1836, plague was very severe in Constantinople and through European Turkey, as far as *the Danube*. At both Malta and *Gibraltar* there was a considerable

In 1830, when another cholerific wave passed into the zone between the isoclinals 30° and 53° N., there was no great activity of the disease in Northern India. In 1831, when the wave passed the isoclinal 53° N., cholera became epidemic in Egypt, and also appeared at Smyrna, Constantinople, and in Hungary. The following year, when the wave had entered the zone to the north of the isoclinal 70° N., the epidemic embraced England, Scotland, Ireland, and North of France, in Europe; and America, from the Gulf of Mexico to Canada.

In 1832, the following cholerific wave passed into the zone beyond the isoclinal 30° N. There was an increase of cholera in Northern India, which became still more frequent the following year. This wave passed into the zone beyond the isoclinal 53° in 1833, in which year Lisbon became affected, and Havanna, and Mexico, which is in the same zone as Northern India. In 1834, the second year of the wave, Spain was embraced in the epidemic, and it crossed the Straits of Gibraltar into Morocco. This year, too, beyond the isoclinal 70° N., Great Britain, Sweden and Norway, and north of Germany to the south of it, were included in the epidemic area, together with the United States, Canada, and Nova Scotia, and even Iceland.

In 1834, another wave entered the zone beyond the isoclinal 30° N. This year there was not much cholera in Northern India, but there was a considerable epidemic in the lower districts of Abyssinia, the second year of the wave there; whether it had shown itself the previous one, I have no information. In 1835, the wave passed the isoclinal 53° N. Cholera became epidemic in south of France, extending up the Rhine to Valence, and in Italy from the Alps as far south as Naples, and the following year in Sicily. In 1836, the

increase of fever over the previous year. Fever increased in England and Ireland in 1836. In 1837, the plague continued in the Turkish provinces along the Danube, but I have no notice as to whether fever was more frequent than usual to the northward. In England, Scotland, and Ireland there was, this year, a severe epidemic of fever, which extended into the following one.

In 1836, the Pali plague, which had been quiescent some years, reappeared in Marwar, and affected the country to the north-east, as far as Delhi. The following year, fevers in the northern part of India were particularly prevalent and severe. In 1836, the mortality among the troops in the West Indies from fever was greatly increased. In Jamaica, on the contrary, it was much reduced, though still high; but, in 1837, not only Sierra Leone, on the east of the Atlantic, but Demerera, on the west, and the West India Islands, as well as Jamaica and Cuba, New Orleans, Bermuda, suffered from a severe epidemic of yellow fever. In 1837, too, plague was frequent from Tripoli along the Barbary coast, to Alexandria, through the southern part of Syria and western part of Asia Minor, and continued up to the Danube. The mortality among the troops in the Ionian Islands, from fever, was four times higher than the previous year, and even at Malta itself remained pretty high.

In 1837, plague had been prevalent from Tripoli to Egypt, and to the north as far as Constantinople. In 1838, this disease seems to have nearly disappeared from Egypt, but it continued severe at Constantinople, and in 1839, there seems to have been some at Broussa, on the east coast of the Sea of Marmora. The mortality from fever among the troops in the Ionian Islands and Malta rose considerably in 1839. In Great Britain, in 1840, fever was, on the whole, less frequent than the previous years, but was still prevalent in several places.

In 1840, plague existed at Cairo, Alexandria, and through the Delta, as a pretty severe epidemic, also through Syria, extending into 1843. In 1841, plague was very severe at Erzeroum, and *fevers prevailed from* wave passed the isoclinal 70° N.; there was little heard of the epidemic in the North of Europe, but, in 1837, it seems to have prevailed at Dantzic, Berlin, and other places in the North of Germany.

In 1836, another cholerific wave passed the isoclinal 30° N. This year the disease was not very active in Northern India, but became considerably more so in the following one, though I have no definite information as to the districts it occupied. In 1836, in the western hemisphere, the epidemic broke out in Central America, causing great mortality in the St. Salvador district, on the Pacific side. It was also experienced at Honduras. In 1837, the wave entered the zone beyond the isoclinal 53° N. Cholera became epidemic in Malta, and reappeared in Sicily, Naples, Rome, and South of Italy, in a severe form, and it extended to Northern Italy and south of France; it was also experienced slightly in various parts of Egypt, in North of Syria, and Armenia. It does not appear that the wave caused any epidemic either in Europe or America to the northward of the countries here mentioned.

In 1838, a cholerific wave passed the isoclinal 30° N., and there was a considerable increase of mortality in Northern India. There was a slight epidemic in Egypt; whether there was any in Persia I have not heard. In 1839, the wave passed into the zone beyond the isoclinal 53° N., but I have no notice of cholera being epidemic anywhere in it, though the course of the wave was apparent in the Mediterranean by an increase of common or sporadic cases, and the following year in England and Canada.

In 1840, the next cholerific wave passed the isoclinal 30° N.; there was a considerable increase of cholera among the troops in Bengal, but a great reduction among those in Bombay, and in 1841, the disease

Bombay northwards, and even in the villages around Simla.

Plague, as mentioned above, continued in Syria in 1842 into 1843. In the latter year fever was very prevalent from Agra northwards, and in Upper Scinde.

In 1844, the fever noticed the previous year seems to have continued in Upper Scinde at least unabated. The 78th Highlanders, between August and March, 1845, (stationed there) buried 669 of their number, nearly all from this form of disease. At Ghazeepore, the 29th Regiment lost 85 men from fever in 1844; so that part of the year, at least, that disease must have prevailed much nearer Calcutta. In 1845, I have no notice of the prevalence of fever over Upper India, or in Persia or Egypt; but in all the Mediterranean stations the mortality from that form of disease was considerably less than in 1844, but in all of them it increased very much in 1846. In 1847, fever, which had increased perceptibly at the end of the previous year, became very prevalent in Great Britain and Ireland, and continued into the following year. Fever was epidemic in Prague and Upper Silesia in 1847, extending into 1848, and intermittents prevailed to an unprecedented degree in Sweden in the latter year.

I have no notice of the prevalence of fever in Egypt or Syria in 1846. On the West Coast of Africa there was the epidemic in the "Eclair," and at Bona Vista in 1845, which was followed up in 1846 by severe fever at Teneriffe, and a large increase in all our military stations in the Mediterranean. In 1847, as already stated, fever was epidemic in Prague and in Upper Silesia, in Great Britain and Ireland, in Sweden, and in all these this form of disease prevailed through the greater part of 1848. In 1847, fevers were *also very* prevalent in New Orleans *and the* Southern States of America, *and in* New York, Buffalo, and was more prevalent in Bengal, while in Bombay it was still further reduced.

In 1842, another cholerific wave passed into the zone beyond the isoclinal 30° N., and there was a severe epidemic among the troops both in Bengal and Bombay. The following year its force was much reduced. I have no evidence of this wave having led to any outbreak of the epidemic form of the disease anywhere to the northward.

In 1844, the following cholerific wave passed the isoclinal 30° N. There was a considerable mortality from cholera in Northern India, but not much greater than the preceding year; but, in 1845, there was a very large increase. This year the epidemic was severe in the northwest provinces of Bengal, the Punjaub, and it invaded the hill districts; it also affected Cabul, extended through Persia as far as the Tigris, and is said to have been at Bokhara in November. In 1846, the epidemic recommenced in the North of Persia, it affected several places in Armenia, passed beyond the Caucasus, along the west side of the Caspian, and traversed the country of the Kirghis Tarters between the Sea of Aral and Orenburg. In 1847, the epidemic was at Moscow in September. In 1845, this wave overspread the zone beyond the isoclinal 53° N., and in 1846, that beyond the isoclinal 70° N. The severe part of the outbreaks mentioned in this paragraph were, consequently, under the second year of the wave in each.

In the beginning of 1846, a cholerific wave passed the isoclinal 30° N. The mortality in the Bombay Presidency was very great, and the sudden outbreak at Kurrachee took place, and the epidemic extended through Persia, and as far north as Diarbekir, and to the westward as far as Aleppo; Aden and Mecca were also included in the epidemic area. In 1847, the wave passed beyond the isoclinal 53° N., and the disease overspread European Russia as far as Moscow. In 1848, the wave passed the isoclinal 70° N., and cholera became epidemic in Petersburg and Finland. About the beginning of October it commenced at

Canada, and in all of these continued active through most of 1848.

Bergen, in Norway, and in England and Scotland, and, about the middle of November, in Belfast, and became a severe epidemic in 1849 throughout Great Britain. The "New York," with emigrants from Havre to New York, was attacked at sea, near the American coast, on the 25th of November, and the "Swanton," also with emigrants from Havre to New Orleans, about the 29th of November, within 10 days of her arrival. The disease commenced in New Orleans apparently on the 13th of December, and by May, 1849, was at Chicago and New York and intermediate districts, and the following months in Canada.

The returns of disease among the troops in the Mediterranean and North American Colonies not having been published from 1847 to 1858 inclusive, the information as to fever through the Mediterranean and in Canada is imperfect, and the analysis could not be carried out with advantage, owing to the scantiness of the information.

In 1864, a cholerific wave passed into the zone beyond the isoclinal 30° N. This wave reached Bombay towards the end of August, 1863, and its first year thus extends from September 1863 to August 1864, inclusive. The mortality there from cholera in that period was 4,813, as against 2,358 for the preceding 12 months, the second year of the previous wave, showing distinctly a great aggravation of the causes of the disease under the advancing wave.

In 1864, east of the Ganges, fever was very prevalent in the gaols, and population generally, from Lucknow, northwards; to the west of the Ganges, it was also very severe at Agra, and prevailed at Nusserabad, Neemuch, and as far as Mhow and Baroda, and included Umballa, Lahore and Peshawur, to the north. In 1865, the southern margin of the fever field to the east of the Ganges maintained the same position as in 1864, and cholera did not advance; to the west of this river, the southern margin of the fever field receded to between Agra and Delhi, but still embraced Ajmere and Pahlunpoor, while, in the Punjaub, it continued as prevalent as the previous year.

A febrific wave was passing to the northwards about *this time*, the *manifestations of which* it is neces-

East of the Ganges, cholera was not epidemic in 1864 farther north than Lucknow, Fyzabad, and Goruckpore, while west of that river, Allahabad, Suagor, and Mhow, indicated its northern limits; but sporadic cases were reported at Bareilly, Umballa, Lahore, and Peshawur. In 1865, the epidemic made no advance to the east of the Ganges, but west of it its area extended so as to include Agra, Ajmeer, Neemuch, and Baroda, while a few sporadic cases occurred in the north of the Punjaub, as in 1864. The epidemic was felt slightly at Kurrachee, and passed along the south coast of Persia as far as Lingar, at the entrance of the Gulf, but nowhere penetrated the interior, as it had done in previous invasions. Early in 1865, the epidemic was raging at Mokullah, a port on the south coast

sary to describe. This wave passed the isoclinal 30° S. on the 1st of January, 1863, and we have indications of its influence in the severe and prolonged fevers Baker and his companions suffered from this year, about 3° N. of the Line, when exploring the sources of the Nile. In 1864, this wave passed into the zone north of the isoclinal 0°. There was this year a considerable increase of mortality from fever among the troops in Ceylon and in Burmah. At Aden fever was considerably more prevalent among the troops than in 1863, though it caused much the same mortality. There was a terrible outbreak of plague, apparently, at Khartoum, at the junction of the White and Blue Nile, while at Cape Coast, in Western Africa, the troops suffered very much from fever. In 1865, when this wave overspread the zone beyond 30° N., there was a severe epidemic of fever at Hong Kong; it continued, as mentioned above, in Upper India, and a malignant typhoid fever raged in the marshy districts on the Euphrates during the summer months. Fever seems also to have been very prevalent at Beyrout during summer, and at Broussa, on the south of the Sea of Marmora. There was also, in the early months of 1865, an uncommon prevalence of low fever, with typhoid symptoms, at Cairo. On the West Coast of Africa there was much fever at Sierra Leone this year; also, in Demerara and Grenada, in the West Indies. At Malta and Gibraltar, too, in 1865, there was a decided increase in the mortality from fever, though it was still moderate. In 1866, when this wave passed into the zone beyond the isoclinal 53° N., there was a considerable increase of fever among the troops at Malta, though at Gibraltar there was much less. At the Gambia, this year, fever was prevalent and fatal, also among the troops in Demerara and Trinidad, and prevalent, but not so severe, among both troops and inhabitants of Barbadoes.

of Arabia, 280 miles east of Aden; and it seems to have appeared at Hodeida, on the Arabian coast of the Red Sea, in lat. 15° N., about the same time. In the end of April or beginning of May, cholera was recognised as prevailing among the Pilgrims at Mecca. On the 21st of May it was on board ship at Suez, on the 2nd of June at Alexandria, and made its appearance at Malta on the 20th, at Smyrna on the 24th, and in the beginning of July it showed itself, almost contemporaneously, at Jaffa and Beyrout, to the east of the Mediterranean, at the Dardanelles and Ancona to the north, and at Valencia to the west. In 1865, this wave overspread the zone beyond the isoclinal 53° N., and the epidemic passed to the northward with considerable regularity; it was experienced at Constantinople at the beginning of July, in the Black Sea, at Trebizond to the south-east, and Kustendji on the west, and for some distance along the Danube in the first week of August, at Odessa on the 6th, and Kertch on the 17th of that month. It reached Berditchef, in the government of Kiew, in Southern Russia, on the 27th September, and Altenburg, near Leipzic, about the same time, or a little later. The disease also prevailed in Italy and South of France during summer, and reached Paris about the 15th of September; it also extended through Spain in the course of summer and autumn. In the West Indies, the Island of Gaudaloupe was attacked on the 22nd October.

It is worthy of observation that, though about 20,000 pilgrims landed at Suez between 20th May and 22nd June, most of whom passed on to Alexandria, and among whom several cases of cholera occurred during transit, yet the first manifestation of the epidemic in Egypt was at the farthest point they reached. From Alexandria, the epidemic area extended to the eastward and southward, so that Aboukir, Tanta, and Cairo were included in it on the 17th June, Zagazig and Mansoura, on 20th, and Damietta and Suez (the inhabitants) on 26th; along the Nile it embraced Minieh on 30th June, and Kenneh, lat. 26½° on 23rd

July. At Toussoum, on the Suez Canal, upwards of 40 miles from the latter town, there was an isolated outbreak, commencing on 16th July, among labourers occupied in excavating earthwork—always a dangerous occupation during epidemics, and near Suez itself, labourers similarly employed were affected with choleraic diarrhœa in June, and one case proved fatal among these on the 22nd of that month. This movement of the epidemic eastward was not confined to Egypt, but was observed in Syria and Southern Russia as well. Though cholera was at Jaffa and Beyrout in the first week in July, it does not seem to have reached Nablous until considerably later, and though a few sporadic cases were said to have appeared in Jerusalem prior to 22nd August, it was about the 10th October before the epidemic fairly declared itself there. At Damascus the first case was in August, and at Aleppo the disease commenced on 11th August, while farther to the east still, Bagdad had its earliest cases on 25th September, and Mosul on 23rd October. In Russia, though the epidemic had been at Odessa in the first week, and at Kertch on 17th August, it did not appear at Taganrog, at the head of the Sea of Azof, until 12th October, and on 14th November there was an outbreak at Zadonsk, to the north of Voronez, and nearly on the same meridian with Taganrog.

Towards the end of 1865, the epidemic ceased to advance northwards, but remained in a subdued form in France and some other parts of Europe. In 1866, however, when the wave passed into the zone beyond the isoclinal 70° N., as soon as the weather began to get mild, cholera again became active, and the epidemic gradually crept up to and passed that line, in Russia, Sweden, and Norway, Great Britain and Ireland, and appeared in the United States, not only from New York and Boston to Chicago, but embraced Savannah, New Orleans, and Galveston, in the south. It was scarcely experienced in Canada, however, there having been 13 cases only in Stratford, a small town in the western part of the country, in the month of October.

In the West Indies, cholera became epidemic a second time in Guadaloupe early in 1866, and appeared also in Martinique.

The details given above, when carefully examined will leave little doubt that the progress of epidemic cholera has been most materially influenced by the existence of fever fields in its course. It may be useful, however, to recapitulate the chief points before concluding the paper.

In Northern India, it has been shown that cholera frequently did not occupy the whole country, but existed with severity in one part, while another was free from it. The evidence at my disposal did not permit me to define these portions accurately for any epidemic anterior to that of 1864–5; it is obvious, however, that in 1818–19, in 1836, in 1840, and in 1844, the prevalence of fever in the western part of that country had materially interfered with the extension of cholera there. In 1864–65, the details of the Sanitary Report for Bengal and other sources, admit of the limits being laid down with tolerable accuracy, and they bring out the remarkable fact that, for two years in succession, cholera presented itself as a severe epidemic, from the sea on the west, to the foot of the Himalayas, its northern limit just embracing Baroda, Neemuch, Ajmere, Agra, and Lucknow, and during these years, the country to the north of this line was suffering from a severe epidemic of fever. As illustrating that point farther, I may mention that the fever diminished greatly in 1866, and remained comparatively low during most of 1867, and it was in the end of 1866 only the cholera passed the line it had reached in 1865, and became developed into the extensive epidemic of 1867 in this district.

The extension of epidemic cholera westward in 1823 seems to have been checked by impinging on a fever field extending from Egypt through Asia Minor. The circumstances in 1826–27 were similar, and again in 1828–29, in the latter of which years the disease had reached Astrachan, but the apparent diminution of fever to the west of the Black Sea, and probably also over South of Russia in 1830, permitted it to extend into Europe that year. In 1830, when a fresh wave was passing up, Egypt being occupied by plague, cholera did not appear there; but in 1831, when the plague diminished, cholera took its place, and the same year affected Smyrna, Constantinople, and Hungary, and, in 1832, north of France and Great Britain, the fevers previously rife in these countries having then decreased. In 1833, under a fresh wave, Lisbon, Havannah, and Mexico were affected, and, in 1834, the epidemic embraced Spain, Morocco, Great Britain, Sweden, and the United States and Canada. In these years the South of France and the whole of the Eastern part of both shores of the Mediterranean were free from cholera; but as far as the evidence serves, fevers were very prevalent over them. In the West India Islands also fever increased in 1833, and in Jamaica the ratio of deaths from it, though lower than the previous year, still remained considerable, so that the non-extension of cholera into the south here, as in 1865, was coincident with a frequency of fever in the districts which escaped.

In 1835, the South of France and Italy, from the Alps to Naples, which had hitherto escaped, became affected with epidemic cholera; in 1836 Sicily was included. In these years, especially the latter, there was much fever in Gibraltar, Malta and through Greece, Turkey, and Egypt. In 1837 under a fresh wave, Malta, became affected, and the above districts again suffered, but Greece and Turkey escaped, the latter, at least, still being extensively affected with plague. The limitation of the epidemic for three years to France, Italy, Sicily, and Malta, in the centre of the Mediterranean, while the surrounding countries, as far, so our evidence goes, were occupied by fever, is a very striking fact.

In 1847, cholera was again at Moscow, and in the course of 1848 it spread through North of Germany, and reached England late in the year. There *had been* much fever in the Mediterranean in 1846, and in 1847 the *embraced* Great Britain on the [illegible], and Silesia on the other; the fev-

declined in Silesia in the course of 1848, and towards the close of the year in England, before the cholera acquired much force; the same feature was observed in Sweden and the United States and Canada.

The relations of the two epidemics in India, in 1864 and '65, has already been noticed. The immunity of Persia, Arabia, and West Coast of the Red Sea from cholera, in 1864, seems to have been connected with the prevalence of fever in these countries that year, and in 1865, when the epidemic extended to them, it established itself slowly, and only when the fevers previously occupying the various districts diminished. In this way, it did not radiate from Suez, where the pilgrims were supposed to have carried it, but from Alexandria, and then extended eastward and southward in a regular manner, not along certain lines of communication, but over the whole face of the country, and the same peculiarity was observed through Syria, and as far as the Euphrates.

In submitting these remarks to the Profession, it appears advisable to remove an erroneous impression regarding the scope of my views as to pandemic influences which seems very generally entertained, that is, that I regard them as the sole causes which produce epidemics. It is difficult to understand how this misconception could have arisen, as in all my papers on the subject it was expressly stated that, in accounting for the local developments of disease we have to deal with, both causes connected with persons, and with localities as distinguished from persons, must be taken into consideration, as well as those of a more general nature. It is true, that if the operation of general causes be conceded, the influence hitherto attributed to those depending on persons or localities must be profoundly modified, but their recognition, and the true limits of their operation, are no less necessary for a philosophical explanation of the generation and spread of epidemics than before the pandemic influences were thought of. —*Mr. Lawson's Pamphlet.*

11.—THE ATROPHIES AND DEGENERATIONS OF OLD AGE.

By Dr. W. Moxon, Assistant Physician and Pathologist to Guy's Hospital.

Little interest would belong to the atrophies of old age, if old age came upon us uniformly in all our components; we then need not study each part; but we age in systems. Some men, especially gouty men, have kidneys that grow old before their time; every person over three years old has some old age about him, and we cannot over-estimate its importance. In different people this atrophy affects different systems; in some the lung ages and wastes early; in others the aorto or cerebral arteries; in others the bones or cartilages. The same fact is familiar enough in different people, in the falling off of the hair, which we know occurs in people without any weakness in intellectual and muscular vigour. Many insurance offices ask after the teeth and after arcus senilis, as if the failing of one system showed all to be weak; but no insurance office, as far as I know, cares for a man being rather bald, though this is quite as significant as the other signs sought. Arcus senilis has no relation to other fatty degenerations, so as to prove more dangerous states within, although it has been thought to have such a value. We age in systems; the cornea in one, the arteries in another. It is interesting to notice where the arcus begins; this points to its cause. You see the arcus first under the upper lid in the part of the cornea so covered and prevented from its function of transmitting light; a patch of arcus is very common there, evidently from loss of its function. In the same way, when the bones are old and fatty, you will find the fixed ribs soft when the false ribs are hard—the latter still doing duty more actively as levers in breathing than those fastened to the sternum. We mentioned that, just as hypertrophy passed into tumour, so atrophy passes into degeneration. There is a very sharp distinction between atrophy and degeneration; the former means wasting without change of composition; the latter means change of composition; *but I cannot say this* very natural distinction has much value, for

we rarely see elements waste very much without change of their composition; the distinction is best realized in the case of baldness (atrophy of the hair) and greyness (degeneration of hair). The two forms of senile imperfection of the lung are also like this in their relation—the one being a passive wasting away of air cells, leaving a simply thin, delicate, atrophic lung; the other a coarse, thickish, bloated lung deformed with blebs, and in its minute texture having undergone rather transformation of its elastic tissue to an inelastic or less elastic substance, with fatty degeneration of its epithelium. The first is a bald lung, the second a grey lung; and each kind has its own peculiarities of history and results. Except in these examples, we scarcely ever see wasting without degeneration of the wasting tissue into fat grains, or albumen grains, or lime or pigment. Some authorities feel a satisfaction in ascribing this change of the cell elements into fat to a slower flow of the liquids in their course within the cells; but the immediate cause of it is not likely to be made out until we know better what constitutes life.

There is a very close relation between the abnormal change to fat which always supervenes on mere atrophy and the normal fatty change which occurs in the life processes of some tissues. Thus, in the formation of milk, cells grow, become fatty, and break into a fluid charged with fat. What is normal in these cells of the acini of the mamma may occur abnormally in the muscular and elastic fibres of the arteries in atheroma, and in many other places, even to the connective and other tissues of the milk glands, so that in old people the mamma itself turns to a sort of milk. This is so far unfortunate; but it is not only in the case of strictly normal fatty destruction, as in milk formation, that we have a desirable result. Take the case of pneumonia, which you know now is anatomically a charging of the air vesicles of the lung with vast crowds of nucleated cells which stuff the vesicles.

The normal process of recovery from pneumonia consists of a fatty change of these cells until they behave exactly like milk cells, and burst into a milky fluid that is easily absorbed. Thus we get rid of them. The fatty change of these cells is the principal cause of the grey colour of old hepatisation, and it is the promise of recovery, not at all to be confused with purulent infiltration of the lung, which is always primary and never results, as a further stage, from grey hepatisation, as is often assumed. Purulent infiltration of the lung only occurs in low and bad inflammations, and is purulent from the first; pus will come from the crepitant lung. The fatty change that is normal in milk and fortunate in the pneumonic cells is a serious disease when implicating the arterial coats, through exhaustion of their vitality in old age, and it is a serious and significant thing when occurring in the epithelium of kidney as a consequence of the exhaustion from long-lasting inflammation of Bright's disease, where its presence makes the whiteness of the large white kidney—not that the fat is the disease, but it is an index of the inflammatory exhaustion. For, as we have seen that atrophy may be the direct result of inflammation in muscle fibres and nerve fibres, so it may also be the indirect result of inflammation in tissues little prone to such atrophy; indeed, no tissue is exempt from this. Excessively-prolonged irritation will at last lead to the wasting away and degeneration of areolar tissue of skin. In the leprous subject which we inspected two years ago, the skin and subcutaneous tissue, which had long been the seat of the leprous inflammation, had its elements wasted beyond microscopic recognition, and lines of fat and pigment took the place of areolar fibre-bundles, the skin being so rotten in consequence, that it tore when pinched. Long-standing inflammation so produces the results of senility.

Atrophy, then, like hypertrophy, stands in this relation to inflammation—that inflammatory irritations produce it directly: but, on the other hand, either occurs without inflammatory irritations, and those cases, where they *so occur*, lead into opposite kinds of pathology—atrophy into senescence in *decay*, hypertrophy into juvenescence in tumour.—Med. Times and *Gazette*, *Dec. 10, 1870, p.* 667.

DISEASES OF THE NERVOUS SYSTEM.

12.—ON THE CLINICAL OBSERVATION OF DISEASES OF THE BRAIN AND NERVOUS SYSTEM.

By Dr. THOMAS LAYCOCK, Professor of the Practice of Medicine, of Clinical Medicine, and of Medical Psychology, and Mental Diseases, in the University of Edinburgh.

The law of direction of physiological activity or of the *vis nervosa*, applied to the investigation of diseases of the brain and nervous system, is really an application to clinical research of the well-known laws of reflex action. But very few are aware that the direction of physiological activity indicates also the direction of structural degeneration. For this reason, and because of its great practical importance, I must call your special attention to this general fact. As the late Dr. Waller demonstrated it to be the law of degeneration of both the motor and sensory spinal nerves, and showed its value as a means of both anatomical and pathological research, I have named it the WALLERIAN LAW. I am, however, responsible for extending its application from the spinal cord and nerves to the brain and nerves of special sense. I may say now that, on the report of Claude Bernard, Dr. Waller was awarded the prize of 2000 francs, given by the Academy of Sciences, for experimental physiology in 1856. You will find the extended views of the question in my psychological text-book. The facts are simple. If the two roots of the second cervical pair of nerves of an animal be divided (and this can be done in the dog and cat without exposing the cord), and it is allowed to survive a few days, certain results will follow. The posterior root between the ganglion and the cord will be found to have undergone degeneration, and also its continuation upwards in the cord; whereas, the anterior root and that part of the posterior root still in connection with the ganglion will be unaffected. It is thus shown that the ganglion influences the nutrition of the sensory or afferent nerves, and the anterior columns that of the motor nerves; in other words, degeneration goes on in the direction of physiological activity. Serres observed the same condition in a case of disease of the Gasserian ganglion; he traced degeneration along the decussating fibrils to the opposite hemisphere. So that disease of a sensory nerve which implicates the sensory or intervertebral ganglia will extend centripetally or adcentrically as far as its ultimate connections, and not unfrequently, therefore, reaches as high as the hemispheres, the organ of perception and thought. It is in this way we can understand how insanity results from apparently very remote and unlikely causes. If the degeneration begins exclusively in one set of sensory or motor nerve fibrils, it may be, and often is, limited to that set all the way up or down. We thus understand how it is that in disease one set of fibrils is picked out, as it were, from the rest.

Another point of importance was shown by Waller—namely, that the intervertebral ganglion influences the nutrition of the distal sensory fibrils; for when a mixed spinal nerve is divided on its distal side, both motor and sensory fibrils undergo degeneration. Hence the conclusion that excessive activity or exhausting use of the sensory nerve and ganglia will affect the nutrition of the sensory fibrils. This seems to be the order of causation in certain kinds of locomotor ataxy.

The problem to solve being, then, the order of symptoms, we have to inquire in any case where in the nervous system the functional or structural changes began, and then follow the line of physiological activity. This is already done with much success in cerebral hemiplegias; but the sensory and trophical neuroses have had little attention paid them in this way. There are two such lines in all neuroses—namely, the direct and the decussating—whether the line of activity be centripetal and adcentric (sensory, afferent) or centrifugal and excentric (motor, afferent). In either kind, single nerves and nerve-centres may be affected, or many nerves and centres. Affections of *the sensory nerves* in the latter case influence central parts by

what has been termed radiation of sensation—the phrase meaning diffusion, anatomically, of the degeneration among the centres—so that several functions are disordered. I will give you illustrations of these views.

An injury to a sensory or afferent nerve may be followed by varying centric disorder and disease. In traumatic tetanus the spinal trophic system of the flexor and extensor muscles of the lower jaw, limbs, and trunk is so affected that tonic convulsions follow upon a slight touch or even change of temperature; or, the injury may cause a neuralgia and no tetanus, but spasms and epileptic convulsions; or, there may be no neuralgia, only illusive sensations, as an aura, numbness, and yet centric encephalic disorders result; or, there may be no change perceptible by the patient, and yet there may be various vesaniæ, such as the so-called "masked" epilepsy, mania, melancholia. I give you as an illustration an instructive railway case. On March 24, 1866, a house-agent and tax-collector, aged 60, weighing 22 stones, was holding on a railway carriage, when the guard crushed the end of his finger by shutting the door, so that a portion was squeezed off. He suffered much from pain and loss of blood, and reached home faint and exhausted. The finger healed, but in the course of a month after the injury he had a slight tetanic symptom, and in a few days after that a sort of fit. He now complained, also, of numbness and strange sensations in his hand and arm, twitchings of the face, and a sense of weariness and loss of strength, so that, although previously in robust health, he was unable to undergo even slight exertion without a feeling of fatigue. He resumed his office-work for six months, but got slowly worse, becoming highly nervous and dreadfully depressed. He had next numbness of the body and faintness; then by degrees his powers of speech, of motion, and vision failed; and at last he died, September 13, 1867, nearly eighteen months after the accident. This is one of the many kinds of injuries to the nervous system railway accidents cause. What was the probable pathological anatomy? First, degeneration of the afferent fibrils of the injured finger: then of the intervertebral ganglion: then radiation thence, either upon other ganglia, including the Gasserian, or else upon the sensory structures of the cord: next, as a sequel degeneration, either of the vessels or lymphatics, or connective tissue, or of all, so that the functions of both the sensory and motor sides of the cerebro-spinal centres were abolished. The progressive disease, the age, and the great weight of the sufferer lead to the inference that the degenerations were diathetic.

The element of time is a very important point in the diagnosis and prognosis of this class of cases: the progressive degeneration may extend over several years. In July, 1868, I saw a captain in the Royal Navy, who, fifteen years before, when a midshipman, fell about eight feet as he was descending Table Mountain, Cape of Good Hope. He received a scalp wound, which bled freely, and he thought he must have been made unconscious. The surgeon of his ship examined, but found no fracture, and dressed the wound, which healed well. I found an extensive scar on the scalp over the curve of the left parietal region, and the surface slightly depressed. This had led some to propose trephining. Twelve years subsequently to the injury, he married, and shortly after had habitual headaches, with mental depression, increasing until he became profoundly melancholic. Rest from active duty restored him to comparative health of both body and mind, but his manner continued to be peculiar. He, however, resumed charge of a ship, and so got involved in anxious and harassing night duties off the Irish coast, watching the Fenians. This exhausting work induced a series of neuroses of the encephalon, which were progressively intensified into structural disease, until when I saw him he was weak of mind, incapable of movement, passed urine and fæces involuntarily, and had great difficulty of articulation, as well as an incapacity to express his ideas by appropriate words, although he easily smiled and laughed. Early in November of the following year he had successive fits of *convulsions*, became unconscious, and so died, sixteen years after the injury *to the scalp*. Long as this period may appear, I knew a major, whose

insanity was attributed, and I believe rightly, to a scalp wound (sabre cut) received at the battle of Waterloo, thirty years previously.

The relation of these exciting and predisposing causes to time—and long time—is one of the most important points in the observation of diseases of the nervous system. It meets you everywhere. Thus, the tendency to leprosy (which is a trophesy) will lie dormant in Europeans who have been resident amongst a leprous population, and be manifested several years after their return to Europe, when exciting conditions arise. If the constitutional tendencies be diathetic, and not acquired, as in the syphilitic and leprous, the climacteric period strongly predisposes. Any shock to the nervous system, sometimes comparatively slight in character, often serves to weaken the dormant tendency into activity. Marriage, which was thus operative in the case of the naval officer, is specially influential when entered upon in old age, or at the climacteric period, which practically are the periods when constitutional tendencies to degenerations shew themselves. Various diseases of organs which have direct sympathies with the brain and cord are thus apt to be exciting causes.

The decussating anatomy of the nervous system must be noted to observe well these various causes. In the optic nerves and their commisure we have an illustration of both the direct and decussating anatomy of all the sensory nerves of the trunk and limbs. But afferent nerves, which do not naturally subserve to sensation, will influence the opposite side of the central axis. Thus, there is a connection between wasting of one ovary, or one testis, and wasting of the opposite half of the cerebellum. I think I have seen cases of a like relation between disease of one kidney and the opposite half of the cerebellum. An affection of one knee, or one foot, will affect the kidney or the ovary on the opposite side. Nay, it would appear that the milk in the two mammæ is secreted differently from this unilateral action of the nervous system. It is well known that infants will refuse the milk of one breast and take that of the other. The decussating influence of the injured ciliary nerves of one eye in inducing inflammation of the other is another instructive example of these trophical sympathies.

The law of degeneration, as a retrocession to a lower kind of tissue-change, may be applied to the pathological anatomy and chemistry of organs and tissues, and enable us the better to understand the neurotic causes of morbid changes. Thus, nervous debility, considered as a deficiency of trophic energy, will coincide with anatomical and chemical tissue-changes of a lower type. The production of uric acid, the *materies morbi* of gout, is an illustration: it is a normal chemical product of transformation of tissues in reptiles and birds; in man it is abnormal, being a retrocession from urea. So lactic acid appears to be the result of a retrocession in muscular transformation from a higher compound. Carbons and hydrocarbons as pigments and fats follow the same law as to place of production; amyloid degenerations are chitinous.

In diathetic anatomy, diagnosis, therapeutics, the evolutional law of tissue-anatomy upon which I found my clinical view of diathesis is an important guide to pathological inquiries. Nothing can be more vague than the current doctrines. Eminent French Physicians speak of a "herpetic" diathesis or of an asthmatic deathesis—phrases that have really no definite application to tissue-changes, and are, I think, worse than useless. I must remind you that the word diathesis means a special putting together of the fundamental elements of the body, and has no regard to particular organs or viscera, except in so far as a particular tissue predominates therein. The general law to which I refer is that with which you have been made acquainted already, and is the order of evolution of tissues in the embryo. This order indicates the general or common pathological relations of fundamental tissues. Firstly, the germinal membrane appears as the common basis of all; then follows its division into the "mucous" and "serous" layers. Out of the serous layer is evolved the whole voluntary motor apparatus of bones, muscles, aponeuroses, ligaments, and serous tissues; so that, as they are all related to each other by common origin, they are

related to each other nutritionally and diathetically, and have probably a common relation to a trophical system. The heart and vascular system have a like common evolutional origin out of the vascular layer of the embryo, which, however, is a conjoint product, and has the conjoint qualities of the mucous and serous layers. In diathetic anatomy the difference is shown by the distinction between gouty degenerations affecting the structure of the heart and arteries and of the synovial membranes of joints, and the rheumatic which involve the fibrous structures and fibrous pericardium, and aortic and mitral valves.

The hereditary tendencies to diathetic diseases and degenerations as thus defined and fixed on an anatomical basis are more easily comprehended when we remember that tissue-changes in plants are hereditary, and that consequently it is a regulative principle, as vis nervosa, which, in animals endowed with a nervous system, must be operative on the sperm-and-germ-cells. Now, a regulative energy, manifested as the "nisus formativus," is the special property of these minute portions of matter, and consequently it must be by a concentration of that energy, as vis nervosa on the genetic glands, that the peculiar property is supplied. If, therefore, the innervation be defective in regard to these glands, the regulative or evolutional power will be defective. It is I thus explain how congenital degenerations of structure and defects of function and form take place, from deficient vis nervosa in the parents, for in these sperm-cells and germ-cells, as in other tissues, the law of degeneration is retrocession to a lower type. The nature and results of that defect in brain-nutrition upon which hereditary insanity depends is a striking illustration of this law of hereditary disease and defect; it is the lower or animal appetites and instincts which crop out in hereditary insanity.

Before we consider special tissue-changes as trophesies, let us clearly understand what we mean when we speak of loss of tone, of nervous debility, and of defective innervation. It is clear, from what I have said, the phrases may refer either to defective vital energy in general, or to defective regulative energy especially, in which case it would be to the sensory portion of the nervous system we should look. Now, when we are made conscious of this class of changes, pain, langour, unease, and other like feelings are experienced. Hence, it seems useful to inquire with reference to two kinds of vis nervosa, the one as being a molecular energy, necessary, like heat, to all healthy tissue-work, the other regulative of its production and application. This latter is therefore needed, not to the end that the tissue changes shall take place—for we have seen that they can and do go on independently of nerve—but that they shall take place in their proper or normal order. For example, if a defect in a nerve or nerve centre (nervous debility) is followed by the production of heat or of uric acid in the tissue it innervates, these changes occur because the tissue is set free from the regulative restraint exercised by the nerve or nerve centre. Now, I think clinical facts enable us thus to distinguish two kinds of trophic vis nervosa with corresponding anatomical seats, for we can differentiate a regulative from an executive kind just as we distinguish a sensory and a motor. Here, again, the law of evolution helps us to a clearer understanding. Just as the trophic vis nervosa is an evolution and differentiation of vital energy, so that by which we are conscious and act volitionally is an evolution and differentiation of the regulative element of trophic vis nervosa. It is that regulative principle which, as manifested in nutrition and development, was, and indeed still is, termed, the *anima psuche*, soul; and as manifested in mental life, as the *animus*, mind. This unity and continuity of vital phenomena is the great truth of Medicine, as it ought to be of philosophy. I do not know in the whole range of the practice of Medicine questions of greater importance than those comprised in the relations of nervous debility, in the scientific meaning of the term, to states of consciousness. It implies not only a true knowledge of the relations of pain to *disorder* and disease, whether in the merely corporeal forms, as tenderness *on pressure*, hyperæsthesia, neuralgia, and of diminished and abolished

sensibility, as anæsthesia—for pain and anæsthesia mean practically changes in the vis nervosa—but of all mental suffering. Pain and suffering are so commonly associated with disorder that the word disease is its synonym, and the ancient word pathology means primarily the science of suffering. Hence it is that the psychology of pain and suffering is so important a division of the practice of Medicine; for how can we understand otherwise the commonest experience—*e.g.*, the use of opium and other sedatives in inflammations and painful diseases?

What, then, does pain mean in general?

When all the nutrient and mechanical work of the body goes on according to the rule or *norma* of vital activity, the functions are said to be normal and regular, and the body healthy. Corresponding to this normal bodily condition is a mental condition, the feeling of health and of being strong and well, which, if contrasted with the mental state that corresponds to what is abnormal, is pleasurable. It has been named variously, but perhaps the best term is cœnæsthesis, or common sensibility; morbid states of it are to be classed with the *æsthesæ*. The feeling of ill-health generally, or malaise, or whatever name be given to that which accompanies what is abnormal, if there be a feeling at all, must have its seat in a like portion of the nerve-centres as the feeling of health, and this, in accordance with the principle formerly laid down as to the seat of all conscious changes, must be in the brain. Both states of consciousness correspond in regard to the body to that unity in regard to mind which the metaphysicians name the "ego"; hence these facts prove, in conjunction with many others, that there is a trophic corporeal centre, or series of centres, just as there is a mental centre or series of centres. This we shall be able to fix in a well-defined basilar region of the encephalon, which includes the medulla oblongata, cerebellum, and cerebral ganglia. Whatever may be said of local pain or uneasiness may be said of these general feelings. Hence we must remember as an important fact in clinical observation that all pain, whether it be local or general, and however named may be illusive as to both seat and cause. It is so with the feeling as to health and unhealth, for, just as in a neuralgia, a person may feel as if he had disease of an organ when it is healthy, and *vice versâ;* or when strong and well may feel ill and weak, and have delusions as to the nature and cause of his illusive illness and weakness. The term "well" means, as thus used, that there is no disease of organs, or tissues, or blood, as causes of the feeling of illness, but that there is central disorder or disease as a neurosis, termed hypochondriasis and hypochondriacal melancholia. When it is not purely sensorial the painful state is best named dysphoria. These centric suffering states (phrenalgiæ) are often as painful as neuralgiæ. I have known hypochondriacs with the feeling of muscular debility, yet strong in muscular development, as incapacitated for labour as if really weak and ill in their muscular system. On the other hand, a patient seriously diseased may feel quite well—may have, indeed, a pleasurable feeling of health. This I term euphoria; it is this, when manifested in cases of phthisis, which has been termed the *spes phthisica*. A wider euphoria is seen in certain cases of insanity with paresis, in which, from a particular kind of morbid-brain nutrition, the patient thinks himself endowed with strength beyond estimate. A third class of cases are those with no sense or feeling; they have apathy or aphoria. Such persons, when very seriously ill—ready, in fact, to die—make no sign of feeling ill. This state occurs in dangerous cases of epidemic cholera and in fevers of a bad kind: the patient will go about wholly unconscious of serious illness or of his impending death.

What is said of these general bodily feelings, as commonly altered in disease, applies equally to special bodily feelings and conditions. Exaltation, perversion, abolition of sensibility have their respective trophic conditions. The results of anæsthesia of the pulmonary system, with evolution of motor vis nervosa, are seen in another form than the *spes phthisica*, when tubercular meningitis comes on in the course of a phthisical case. Even with large vomicæ *the cough* and expectoration will cease, the voice, as the

patient raves deliriously, becomes loud and strong, and the corporeal strength marvellously developed—conditions all due to changes in that basilar trophic region I have hinted at. On the other hand, there are cases of insanity in which the central trophic region is defective in both sensory and executive or motor vis nervosa, and the results are wholly different, manifested as low forms of pneumonia, sometimes ending in gangrene of the lung; precisely for the same reason as sloughing occurs in certain kinds of palsy, as in typhus and paraplegia.

The clinical rule deducible from these considerations, is, that when we desire to ascertain the causes and consequences of trophic nervous debility, we inquire whether it is the regulative—*i.e.*, sensory vis nervosa that is deficient—or the executive—*i.e.*, motor. Excessive use (functional activity) often determines this. Pleasurable sensory excitement, if excessive, is a using-up of the sensory or regulative vis nervosa. This is one cause of the debility induced by sexual excesses, and of locomotor ataxy as a special consequence of that debility. Pain, too, when excessive, is exhausting. Excessive thought, without anxiety, uses up the materials subservient to sensory excitation; and in this way the regulative energy as regards the organs and tissues may be defective, and neurotic disorders of all kinds follow. But excessive thought, with mental anxiety, care, and pain, as grief, is much more exhausting, and therefore more commonly followed by trophesies. In the exhaustion caused by sexual excesses of males a third element is added—viz., the waste of a highly evolved tissue analogous in chemical composition and in vital endowments to brain—viz., the sperm-cell proper. In the sexual excesses of the female, this cause is not so operative, but chiefly the sensorial exhaustion of excessive pleasurable excitement. In like manner, the loss of blood, as in hemorrhages, or of albuminous nutrition, as in albuminuria, or the want of proper food, enfeebles both the regulative and the executive portions of the trophic system.

Induced in these and other ways, nervous debility causes a variety of both local and general diseases of organs and tissues, which necessarily differ almost infinitely, according to the kind of tissue and the portion of the nervous system involved, and the causes thereof. It will help greatly to understand and classify and treat these if we know what is general as to nerve and tissue, and what is purely local. For example, there is a whole class of gouty tissue diseases which are essentially neurotic, and to be separated from those in which there are local changes as causes. Before inquiring, however, into these, we must first consider tissues in their relations to the nervous system, and then mark out a clinical trophic anatomy as a guide to etiology, diagnosis, and therapeutics.—*Medical Times and Gazette, March* 18, 1871, *p.* 301.

13.—A CASE OF TETANUS SUCCESSFULLY TREATED BY HYDRATE OF CHLORAL.

By Dr. A. G. Lawrence, Chepstow.

[The patient was recovering from myelitis, when some movements of the spine produced acute pain up the spine into the back of the head.]

Early on the morning of the 30th I was summoned to my patient, and was told she had passed a very restless night, and had not slept till 6 A.M., and awoke at 6.30 with her jaws firmly fixed and unable to open her mouth in the slightest degree. She complained of great stiffness and pain in the neck and jaws, accompanied with sharp spasm. The muscles of the back and legs were also rigid, the spasms never entirely ceasing, but being aggravated every quarter of an hour, and then partially subsiding. There was no hardness or rigidity of the muscles of the abdomen. Her voice was husky; she had the greatest difficulty in swallowing, and the saliva trickled down her chin. She had a careworn expression, and anxious painful smile. The sensibility of the skin was so much diminished that she did not feel the effect of the blisters which had been placed on the jaws the night before, and which

had risen considerably. I immediately ordered three drachms of Ferris & Co.'s syrup of chloral hydrate in half an ounce of water every three hours, and should the spasms relax, as much beef-tea and milk to be given as she could take. Half an hour after the first draught a feeling of glow had come all over the body, and, from being exceedingly cold, she became quite warm; the tonic spasm of jaw and legs began to subside, and she was able to open her mouth sufficiently to admit the handle of a teaspoon, and could with difficulty swallow a little beef tea, though the act immediately excited spasm. After the second dose the pain and spasm in the legs and jaw were much lessened, and she was able to open her mouth sufficiently to admit the end of a pencil-case; but no sleep was produced, although a calming influence had set in. After the third dose the spasm and pain subsided, so as to allow the mouth to be opened wide enough to admit a teaspoon, and beef-tea and egg-flip were constantly given.

Dec. 31. I found my patient had slept all night; the spasm and pain in jaws and legs had entirely gone; she was able to swallow well without producing spasm, and only complained of great soreness of the muscles of mastication and of the lower extremities; she was, however, quite unable to use the former. Has had one dose of chloral this morning, which is to be repeated at bedtime.

My patient continued to improve till Jan. 3rd, four days after, when, in having her bed made, the maid wrenched her back, which in one hour brought on all the former symptoms in an acute form. The chloral was again administered every three hours, and after the second dose the tonic tetanic symptoms once more entirely subsided.

The point of greatest interest in this case, next to the favourable influence of the chloral, is the production by shock directly affecting the spinal cord of the train of tetanic symptoms which are commonly due to traumatic peripheral irritation. This, no doubt, is to be accounted for by the antecedent myelitis. My patient has continued to improve under a tonic treatment, with chloral only at bedtime, which she describes as producing a most pleasant feeling, and in half an hour after taking it a warmth comes, first in the hands and arms, then in the feet, and in three-quarters of an hour it produces an uninterrupted sleep of two hours. She then awakes to change her position, and falls asleep again, arousing in the morning very much refreshed, free from headache, sickness, or other uncomfortable feeling, and says that she would like to live constantly under its influence. I have tried in her case every anodyne in the Pharmacopœia, all of which deranged the system so much that I abandoned their use; but the chloral has admirably answered my purpose in procuring for my patient a good night's rest without any drawbacks.—*Lancet, March* 4, 1871, *p.* 303.

14.—CASE OF TETANUS NEONATORUM TREATED WITH CHLORAL HYDRATE.

By Dr. WIDERHOFER.

Dr. Widerhofer showed lately to his class a child of three months old, which was attacked by tetanus neonatorum at the end of the first week after birth, and was treated with chloral hydrate in doses of one and two grains at the time of each onset of convulsions. It was in danger for a fortnight. During the intermission of the spasms it was fed from the breast by its mother. It is now a fine, healthy-looking child. This is the sixth case (out of ten or twelve) that Dr. Widerhofer has had of recovery under treatment by chloral. Under all other methods all his previous cases died. Considering that Vogel, and other great German authorities on children's diseases, had quite recently never seen a case of this affection recover, such a success must be taken to indicate a real advance in therapeutics. Dr. Widerhofer gives from two to four-grain doses of chloral by the rectum, if the infant cannot take *it by the mouth.—Lancet, March* 18, 1871, p. 379.

15.—ON THE USE OF OPIUM, BROMIDE OF POTASSIUM, AND CANNABIS INDICA IN INSANITY,

ESPECIALLY IN REGARD TO THE EFFECTS OF THE TWO LATTER GIVEN TOGETHER.

By Dr. T. S. Clouston, Medical Superintendant of the Cumberland and Westmoreland Asylum, Carlisle.

[Dr. Clouston states that he has given bromide of potassium alone, or in conjunction with Indian hemp, in fifty-one cases of various kinds of insanity. In all of these cases the drugs had a fair trial, for a sufficient length of time. Very good results were obtained in a considerable number of cases.]

If to a patient whom one has known to have had regular attacks of periodic mania for years, we give a medicine at the commencement of an attack, and the patient's excitement ceases, contrary to anything known in the history of the case before, then I think we may fairly conclude that the medicine and the absence of mania are cause and effect. If in a case of mild melancholia at the change of life in a woman, the disorder has existed for a year and a half, if most of the remedies ever before recommended for that class of cases had been tried and had failed to do good, and if at last the bromide of potassium procures sound sleep, and immediate visible improvement in appetite, weight, and mental state, surely some credit may be given to it. But if in this same woman its use is intermitted, and all the symptoms at once return, and again immediate improvement follows its employment, so that the patient becomes able to employ herself as she never did before since her illness, and through healthy employment gains in flesh and strength, and gets quite as well in three months as ever she was in her life, surely we cannot deny to therapeutics a cure in the best sense of the term. Or if a cure cannot be expected, as in a case of general paralysis, if a mixture of bromide of potassium and Indian hemp so subdues intense excitement, that when not taking this medicine the patient is noisy, violent, destructive, sleepless, and rapidly losing weight, and when taking it he is quiet, semi-rational, dresses and eats properly, and remains in this state six weeks, till the disease in its natural course passes into its quiet stage, I think here we have a palliative of great value and importance. Or if an old lady gets irrational, restless, sleepless, and unmanageable by her relatives, and if apparently the last alternative to sending her to an asylum has been tried and failed, until half-drachm doses of bromide of potassium and tincture of Indian hemp is found to subdue and quiet this irritability and restlessness, so that she can be quite well kept at home, for the month or two during which this excitement lasts, and until the ordinary dotage of old age to which this excitement was a prelude, comes on, surely the physician's power was augmented, and the patient was unquestionably the better for the remedy he employed.

In acute mania I seldom found the bromide given alone do any good, or, indeed, have any perceptible effect. I gave it in all doses up to 120 grains three times a day, and I continued its use in some cases for a few days. But when combined with tincture of cannabis Indica the effects of the mixture were in many cases very remarkable. Sometimes if the excitement was very intense I began with drachm doses of each three times a day, or, in some cases, every three hours for the first day. In the cases in which the effects were good, they usually appeared by the end of the first day of its use. The patients become less restless, the shouting and violence were abated, and at night they slept. The skin, too, which is so often dry in acutely excited patients became more moist, and they perspired freely. The pulse usually lost in force. Indeed, this is the only objection I have to this mixture, that the force of the heart's action is undoubtedly lessened in *most cases* by it. But I have never seen a single case of syncope, except in *one* woman who fainted two hours after a dose, but soon recovered. The *lessened* force of the heart was shown, too, by the paleness of the face and

skin generally. After the medicine has calmed the excitement the patient remains confused in mind. The intelligence and coherence of ideas, of course, do not usually return for some time. It is often sufficient if one or two doses per diem are given after the first day or two, and I have stopped its use altogether at that time—the patient remaining free from acute excitement. The greatest advantage of this sedative over every other that I have tried in acute mania was, that these patients took their food as well or better during its use as without it. Every one who has acute mania to treat knows that there are three great risks. The patient's appetite may fail, the excitement may cause complete exhaustion or death, or it may last so long that the power of the brain to become the medium of normal mental manifestations seems to be lost or impaired, and dementia results. There can be no doubt that the patients being got to take a large amount of nourishing food and stimulants is of the very first importance in all cases of acute mania, and it is the great risk of taking away the patient's appetite that prevents opium or henbane being more extensively used. Especially is this risk great if we give large doses of opium. It seems to me that the bromide and Indian hemp combined approached more nearly by far than any other drug to our great desideratum in treating acute excitement of the brain, viz. a medicine that will so alter or modify the morbid functions of the brain, that the patient will cease to exhaust all his bodily energy in muscular movement and constant wakefulness, and will at the same time allow the reparative effects of rest and food to act quickly in restoring the normal nutrition of the cerebrum. In some cases complete recovery of the mental powers took place very soon indeed after the excitement was subdued; in others, the confused and incoherent state remained for a long time.

[Dr. Clouston concludes with the following summary:—]

A mixture of one drachm of bromide of potassium with one drachm of the tincture of cannabis Indica is more powerful to allay excitement than any of the other drugs or stimulants tried. It is more uniform and certain in its effects, more lasting, interferes less with the appetite; and to produce the same effect the dose does not require to be increased after long continued use.

Single doses of opium tended to raise the temperature and to lower the pulse; single doses of the mixture above-mentioned to lower the temperature and quicken and weaken the pulse, of bromide of potassium alone to raise the temperature and lower the pulse, of cannabis Indica alone to raise the temperature and quicken the pulse, of whisky to lower the temperature very much and slightly to quicken the pulse, and of beef tea to lower the temperature in the least degree and to lower and strengthen the pulse.

By giving bromide of potassium and cannabis Indica together, not only is the effect of either given separately immensely increased, but the combination has an essentially different action from either of them given alone.

Bromide of potassium alone can subdue the most violent maniacal excitement, but only when given in immense and dangerous quantities, and its effects are so cumulative while so given, that after they have once begun to appear they increase for days after the medicine has been stopped, almost paralysing the cerebrum and sympathetic.

To produce sleep in mild excitement, one drachm of the bromide of potassium is about equal to half a drachm of laudanum. To allay maniacal excitement, forty-five grains of the bromide and forty-five minims of the tincture cannabis are rather more than equivalent to a drachm of laudanum.

Seven cases of chronic mania were treated for twelve weeks with opium, in doses rising gradually from twenty-five minims of the tincture up to ninety minims three times a day, and the results noted. After getting no medicine for several months the same cases were treated with a mixture of bromide of potassium and cannabis Indica in gradually increasing doses, and the results noted and compared with those of the opium treatment.

Under the opium treatment the patients all lost in weight continuously; their morning *temperature* was lowered and also their evening temperature,

but the latter (which was too high, and its being high was a bad sign) very slightly, and their pulse was decreased in frequency. The opium allayed the excitement in the larger doses, but it soon lost its effect.

Under the bromide of potassium and cannabis Indica treatment the patients only lost in weight very slightly for the first six weeks, and after that they gained, their weight being more at the end of eight months' treatment than it was to begin with. Their appetites were not interfered with. Their temperature fell, especially their evening temperature, and the pulse was slightly increased in frequency and weakened in force, while the excitement was subdued, and the medicine showed no signs of losing its effect, even after being thus used for eight months. The maximum of good effects and the minimum of the ill effects of a sedative drug were thus obtained by using the bromide of potassium and the cannabis Indica in combination.

The bromide of potassium alone may be continued for months in doses of half a drachm three times a day, and the patients gain in weight and remain healthy in body.

Cannabis Indica being a diuretic, and the bromide of potassium being carried off by the kidneys, it is probable that the former in that way helps to prevent the cumulative action of the latter when given alone.

When the two are given together, the first symptoms developed are those of the cannabis Indica, but these soon merge into a state of drowsy calmness of the nervous system which is in all respects the opposite of nervous irritability.

Fifty-one cases of various forms of insanity were treated by bromide of potassium alone or along with Indian hemp, and the results were that eighty per cent. of these were benefited more or less in some way, and twenty-five per cent. were most decidedly benefited.

The milder cases of puerperal and climacteric insanity were sometimes remarkably benefited by drachm doses of the bromide of potassium given at night.

In some of the cases of acute mania the excitement was subdued in a few days by the bromide combined with Indian hemp in doses of from half a drachm to a drachm of each given three times a day.

In some cases of periodic mania and general paralysis all the worst symptoms of maniacal excitement were allayed by giving a mixture of bromide of potassium and cannabis Indica in doses of from half a drachm to a drachm and a half of each three times a day. This was continued in one case for nine months with the best effect.

In three cases of periodic mania, attacks were cut short by a mixture of the two medicines, or by the bromide alone. In one of these complete recovery followed.

Fewer cases of simple melancholia were benefited by the bromide alone or along with Indian hemp than any other form of insanity. Some were made worse by them, but in one case of this disease where there was great excitement and hallucination of hearing and suspected organic disease of the brain, the combination gave immediate and complete relief of all the symptoms for four months.

One case of senile mania was successfully treated at home by a mixture of the bromide of potassium and tincture of cannabis Indica, when she was to have been sent to an asylum. It seems probable that some such cases, and also patients with short attacks of mania might be treated by the same medicines at home, when at present they have to be sent to lunatic asylums, on account of the want of such a safe and powerful sedative.—*Brit. and For. Med.-Chir. Review, Jan.*, 1870, *p.* 203.

16.—CASES OF ABDOMINAL NEURALGIA.

Under the care of Dr. HANDFIELD JONES, at St. Mary's Hospital.

The following series of cases is interesting as illustrating the diagnosis and treatment of a disease that it is not always easy to distinguish from other affections in which pain is referred to the abdomen, especially peritonitis, lead colic, and hysteria. The points on which Dr. Jones chiefly insists appear to be—1. That the region of the abdomen, probably its peritoneal lining, is liable to suffer from neuralgia and hyperæsthesia, such as prevail in other situations more notoriously prone to this malady. 2. That such neuralgic affections may very closely simulate peritonitis. 3. That they may be attended with high temperature. 4. That they may possibly pass into peritonitis. 5. That, in their treatment, opium (preferably in the form of enema), tonics, and restoratives, prove to be successful remedies.

The first case is that of M. W., aged forty, a married woman, who was admitted on the 9th of September. She stated that three days previously she had being seized with pain in the lower part of the abdomen and the hips, so violent as to draw her double; since the day before admission it had been gradually subsiding, but with occasional aggravations. Whilst the pain was at its worst the abdomen had been so exquisitely tender that she could scarcely draw her breath, and whilst sitting up she had felt sick. On admission she flinched violently when the left side of the abdomen was touched, and she felt pain on coughing or drawing a deep breath; when she turned on to the right side she experienced a feeling of dragging in the left; the tongue was thickly coated with white fur; the pulse was 78, and not very weak; the temperature 99·3°; there was no blue line on the gums. The right side of the abdomen was resonant, the left dull, and these sounds were not altered when she moved on to her right side. She had no appetite, but was very thirsty; the bowels were habitually confined; the urine was very red, and passed with pain; there was also pain on passing her motions; the catamenia had not appeared for six weeks, but she had a profuse leucorrhœal discharge. There was no history of lead poisoning. She said that she lived over some stables, and had experienced a similar pain several times during the past three or four years; she felt very weak, and the least thing threw her into a "fainting perspiration." She had not being able to sleep during the previous night because dreadful sights appeared directly she closed her eyes; "blood and all that sort of thing, mice running about," &c. The bowels were first relieved by an aperient, and then an enema containing twenty drops of laudanum was administered, and followed by a great abatement of the abdominal tenderness. The treatment was then made to consist of one-twentieth of a grain of strychnine, one minim of nitric acid, and ten of chloric ether, in an ounce of water, four times a day; with simple diet, a pint of milk, and four ounces of sherry. On the second day her sleep had been disturbed in the same manner as before; the abdomen was quite soft and only slightly tender. On the third morning the sleep had been sound and uninterrupted; the bowels were relieved by an enema, and the diet was changed to chop, pudding, and porter, the medicine to twenty grains of the saccharated carbonate of iron, three times a day. On the seventh she was still improving, but on getting up, the pain and feeling of faintness returned slightly. In a few days more she was discharged.

The second case was that of A. N., aged twenty-six, a married woman with three children. She was admitted on Sept. 10th, and gave the following account of herself:—She was in charge of a house which had just been painted, and smelt strongly of paint and varnish, when, three weeks before admission, she was attacked with severe headache, which, two days later, was replaced by an abdominal pain which she described as having been "frightful" in severity, and since its onset she had been unable to lie on either side, or to obtain sleep at night. She had been feverish and without appetite. No other inmate of the house had been out of health. She looked thin and anæmic, had a copious *leucorrhœal* discharge, and was suffering such intense

pain that six leeches were immediately applied to the abdomen, and followed by poultices. On the 13th Dr. Jones found her very weak, complaining of great pain on the left side of the abdomen, but lying with the legs extended; the left flank of the abdomen was dull on percussion; the other regions were resonant. The pulse was 102, not very weak; the temperature 102·5°; the tongue moist. There was no flush on the cheeks nor eruption on the abdomen. The bowels had not been open for two days; the appetite was good; the breasts did not secrete much milk. She was ordered an enema of castor oil, to be followed, after the action of the bowels, by a simple enema containing twenty drops of the tincture of opium; also a draught of four grains of carbonate of ammonia and one drachm of tincture of bark, in an ounce of decoction of bark, three times a day, with a generous spoon diet. On the fourth morning she awoke in great pain from a sleep which had lasted from early in the previous evening. The pulse was 105; the temperature 103.4°. The abdomen was fomented, and another opiate enema administered, and she was ordered twenty grains of the saccharated carbonate of iron thrice daily, in addition to the draught. On the seventh day the pulse was 88, the temperature 99·7°, and pain of a much less severe character recurred from time to time. The diet was changed to one of meat and porter. On the eleventh day the temperature was 100°, and, in consequence of copious night-sweats, the ammonia-and-bark draught was abandoned for one containing four grains of quinine. Subsequently a chloride-of-zinc injection was made use of to check the leucorrhœa. Twenty-eight days after admission she only complained of an occasional return of pain towards evening. No blue line was observed at any time on the gums.

The third case was also a woman, thirty-three years of age, and single. She stated that she had been indisposed for a fortnight, and had kept her bed for a week. The first symptom had been pain at the upper part of the abdomen, all round it, and in the back, great pain also followed on taking food, and was relieved by vomiting. At the time of admission the pain seemed to be violent; she was found to be bending herself down and moaning; the tongue was moist, and tolerably clean; the pulse 80; the temperature 97·5° F. The abdomen moved a little in respiration, but the muscles were at times very hard and tense; there was no eruption. She had no appetite, but was very thirsty. On inquiring into her history, it was elicited that seven years before she had lived in a house whilst it was being painted, and that she suffered at the time some nausea; also, that two years before admission she had suffered for a short time a somewhat similar kind of pain. The teeth were found to be so encrusted and soiled with tartar that it was difficult to determine whether or not a blue line was present. She also complained that for a year she had had pain about the rectum, accompanied by a frequent desire to defecate; but she had never experienced any pain during the passage of her motions. The uterus was found to be reclined, the fundus lying near, if not upon the rectum. She was first ordered a grain of opium every four hours, ice to swallow, poultices to the abdomen, and a subcutaneous injection of ten minims of solution of opium; but neither these remedies, nor an opiate enema which had been administered, were found on the following day to have afforded relief. She was found to be twisting and writhing in bed, although the abdomen bore pressure fairly well. The pulse was 72, and not weak; the urine clear and of high color. She was then ordered a drachm of tincture of valerian and four grains of carbonate of ammonia, in an ounce of infusion of valerian, thrice daily; but she obtained no sleep during the following night, severe pain being excited every time she moved; and, in the morning, the abdominal walls were found to be hard and retracted. The temperature was 98·9° F. An opiate enema was followed by relief, and a grain of opium was ordered to be taken every two hours. On the eighth day two grains of iodide of potassium were added to the draught. On the fifteenth she was ordered, in addition, twenty grains of saccharated carbonate of iron, thrice daily. On the *sixteenth day* the pains became regularly paroxysmal, returning *morning and evening at half*-past ten o'clock. On the same date she began to sweat a

great deal at night; ten grains of quinine daily, in two evening doses, reduced the severity but not the duration of the attacks. The amount of quinine was then doubled by giving four doses daily instead of two, and by the twentieth day she was free from pain and improving in general condition. After this the pains returned slightly, and a treatment as for lead colic was essayed, but, proving unsuccessful, was changed for citrate of iron and quinine, under which they soon began to disappear; and within little more than a month from the date of admission, though the patient suffered occasional returns of pain, the abdomen was soft and mostly quite free from tenderness on pressure, and she was discharged at her own request.

These cases Dr. Jones said, were fair specimen cases of a disorder which is by no means rare, at least among the poorer classes. In calling it "abdominal neuralgia" he had followed unwittingly the example of the late Dr. Addison, who had written a very full and interesting paper on the same disorder in connection with uterine irritation. The term might be thought too vague, but he preferred it to any other, for the reason that it did not appear to him that any organ is specially affected, and that any part of the region in question might be attacked. If he were pressed to localise the disorder more exactly, he should name the peritoneum as the most probable seat, partly on account of the quality of the pain, partly because this membrane is coextensive with its situation. Romberg had described a hyperæsthesia of the mesenteric plexus, but the description he gave of it seemed more applicable to colic than to the malady they were considering. A perusal of the cases, Dr. Jones thought, indicated that the resemblance of the symptoms, especially the pain, to those of peritonitis was quite close enough to make the diagnosis sometimes sufficiently difficult. Dr. Addison had said that the pain occasionally attacked the whole of the belly, exactly simulating acute peritonitis, and that he knew of no more puzzling disease. The points which would prove most serviceable as guides were the previous history, the temperature, the posture, the respiration, the pulse, and the physical signs. If the patient appeared to have suffered from any cause of exhaustion, such as lactation, profuse leucorrhœa, over-exertion, semi-starvation, or the like, a neurosis was a more probable result than inflammation. If the disease was of long duration, such as from two to three weeks or more, and the pain persisted with severity, especially without the development of any other symptom, it could not be peritonitis; the same would probably apply if there was a history of several similar previous attacks. If the temperature underwent no rise, it afforded strong evidence against the existence of inflammation, though a high temperature could not by any means be taken to prove the converse. The second case indicated a temperature befitting typhoid fever, and it was only the sequel which conclusively showed that the pain was purely neurotic. It had been supposed that neuralgia could not coexist with pyrexia, but he had recently seen a case of ephemeral fever in which the patient complained of agonising pain in the limbs, and the temperature rose to 103°; on the day following the pain had greatly abated, and the temperature was found to be normal. As regarded posture, the peritonitic patient was said to lie in a fixed position, instinctively avoiding the slightest movement; the neuralgic often turns and writhes about: the former abstains from using the diaphragm in respiration, the latter does not, or, at any rate, not to so great an extent. After a few days the physical signs would probably afford decisive information. The dulness in depending parts of the abdomen, due to effusion, is not present in neuralgia. So, also, abdominal distension may be looked for in peritonitis, but not usually in neuralgia; though Dr. Addison speaks of a very marked instance of the latter, in which the belly was as tense as a drum and exquisitely tender. The case had been regarded as one of chronic peritonitis, and the surface of the abdomen "presented a most singular appearance from the thousands of leeches" which at various times had been applied. A very important question might be raised—viz., whether a primarily neuralgic disorder may not pass into an inflammatory. Dr. Jones's

belief was that it might, and though he had not observed it in abdominal cases, yet there was considerable evidence, he thought, that such a change may occur in facial neuralgia. For further remarks on this topic he referred to his work on the subject. Some might be disposed to look upon these cases as examples of hysteria, and would have summarily dealt with them by the treatment which Sir T. Watson recommends—namely, purging, followed by an assafœtida enema. To this he altogether demurred. If any definite meaning was to be attached to the term hysteria, it must imply that the patient's will was defective, that she was not sincerely anxious to get well; that, in fact, she wanted moral treatment more than medicinal. Such, he was satisfied, was not the case with the patients in question. The pain felt was, as far as he could judge, as *bona-fide* a pain as ever racked a sufferer from sciatica or tic douleureux; they recovered speedily, and under such treatment as was known to benefit neuralgia elsewhere.

The occurrence of some amount of nocturnal delirium, and that of a terrifying and distressing kind, in the first case, Dr. Jones added, deserved remark. Such disorder was, if he might use the term, quite *homogeneous* to neuralgia, both affections having their root in a feeble paretic state of nerve-centres, and being, as it were, branches of the same stock. The derangement, in fact, was of the same kind in both, and the diversity of phenomena depended on the site of the morbid action; the intellectual centres being affected in the one case, the sensory in the other. There were also indications that the vaso-motor nerve-centres were involved, and suffered in a like way; for the patient in the first case complained of "faint perspirations"— i. e., perspirations attended with a sense of faintness; and in the second, of copious nocturnal sweating, precisely such as is met with in maladies of exhaustion.

Another noteworthy point observed, especially in the first case, and which Dr. Jones said he had not unfrequently met with in other unquestionable neuralgias, was the reproduction of the pain by exertion. This depended on the fact (for such he held it to be) that consumption of nerve-force in one centre, or, to speak more correctly, of material qualified to generate nerve-force under oxidation, diminishes its production in another, and so favours the recurrence of a disorder which is essentially dependent on the failure of nerve-force.

The special cause of the disorder in these cases could not be said to be clearly ascertained. It might be thought that the second was one of lead-poisoning, as the patient had been exposed to the smell of paint; but he could not take that view. There was no notable constipation, and no blue line on the gums. The pain was not like that of colic; it was attended with fever, followed by copious night-sweats, and cured by tonics. He had never seen anything like this in the frequent cases of lead disease he had met with. The lactation and leucorrhœa no doubt had materially promoted the action of the exciting cause.

The diagnosis once made, the remedies to be used were plain. Opium to relieve suffering, tonics to restore strength, the action of both being *led*, rather than seconded, by repose and good nourishment. In doubtful cases, after ascertaining that the bowels had been sufficiently cleared, he advised the use of an opiate enema before applying leeches. The result of this means might be so satisfactory as to make the further treatment clear. On the other hand, it was to be observed that in a puzzling case Dr. Addison thought it an error on the right side (for an error it proved to be) to employ the remedies for peritonitis. The few leeches which were applied in the second case gave relief; but he, nevertheless, thought they were unnecessary and undesirable. It was by no means impossible for such means, by the temporary benefit they produce, to betray the practitioner into their repetition, with ultimately disastrous consequences.—*Lancet*, *Nov.* 19, 1870, *p.* 704.

17.—ON THE TREATMENT OF CHOREA BY ETHER SPRAY TO THE SPINE.

By Dr. JOHN ROSE, Chesterfield.

[The plan of treatment pursued in the following case was suggested by two successful cases of chorea treated in the same way at Lyons, and reported in an early number of the Lancet for last year. The patient was anæmic, and had had rheumatism, but there was no trace of heart-disease.]

I used the anæsthetic ether spray specially prepared by Messrs. Burgess, Willows, and Willows, London. I applied it along the spine four or five minutes at each time; and after fifteen sittings a very marked improvement took place, followed by complete recovery, for which the girl's relatives were most grateful.

The case was a very severe one, and I have no doubt of the efficacy of the ether spray, which is, I think, worthy of further trial in this unpleasant and not uncommon disease, especially when treatment by the bromides of potassium and ammonium, preparations of iron, zinc, arsenic, conium, and last, but not least, chloral hydrate fail. The late Dr. Alison, one of the most philosophical and best practical physicians who ever lived, used to recommend counter-irritation along the spine; and, after enumerating other modes of treatment, candidly said that it must always be remembered that in some cases, where several of these measures have been ineffectual, the disease has spontaneously subsided, particularly under the influence of country air and summer weather. The late Dr. Addison recommended electricity to be applied to the spine; and records several cases successfully treated in this way, after drugs had failed. "I believe," says our medical Cicero, Sir Thomas Watson, "that many cases of chorea—most cases—would at length get well without any aid from physic. I believe, also, that many of the boasted specifics have been quite innocent of any share in the recovery of the patients to whom they were administered; at the same time I am quite certain that treatment has a great influence over the disease." It has long been known that the shower-bath and cold sousing are of great value in chorea, often acting like a charm; and the *rationale* of the action of the ether spray, both as a sedative and a tonic, is, I presume, physiologically speaking, partly at least, the same. It doubtless produces a strong impression on the nervous system, interrupting the series of morbid actions going forward. Perhaps some medical Newton may, ere long, arise who will be able to throw more light on this obscure subject.—*Lancet*, *Dec.* 10, 1870, *p.* 813.

DISEASES OF THE ORGANS OF CIRCULATION.

18.—ON THE CONDITIONS OF DISEASE DEMANDING THE ABSTRACTION OF BLOOD.

By Dr. BENJAMIN W. RICHARDSON, F.R.S.

[There is no doubt that in blood-letting our forefathers held a powerful means of cure, and we are in error in throwing over the results of their close observation and experience in this matter entirely.]

We may sum up the physiological effects of abstraction of blood under a few heads. There is, *firstly*, modification of the balance of the circulating and respirating systems; *secondly*, influx of fluids into the venous reservoir from the tributary supplies; *thirdly*, hydration of the colloid fibrine, and dilution of the saline parts of the blood, leading to tendency to separation of fibrine; *fourthly*, syncope; *fifthly*, convulsion of the muscles from removal of nervous control, with retention of the muscular irritability; and, *sixthly*, decline of animal temperature. From these facts we may turn to the application of blood-letting in cases of disease, and may ask, and try to answer the question, *What are the conditions of disease demanding the abstraction of blood?*

The Practice.—In considering the practice, the first thought is that those effects of bloodletting, which might be expected to be useful, are such as may be called mechanical effects: in plain, whenever the venous reservoir is under distention, so that due motion of blood and of function of part depending on motion of blood for function is disturbed, abstraction of blood is the most direct remedy. We will consider these cases.

Cases of Lightning-stroke.—The experience of many observers on the efficacy of venesection in cases of lightning-stroke is entirely in support of the value of this remedial measure. In my lectures on lightning-stroke, I have recorded a case in which a man who had been rendered insensible by lightning was bled in the freest manner, the consciousness returning during the bleeding, and the recovery being secured. The older men in Physic, who always opened a vein in such cases, were apparently clear as to the importance and success of the practice; and within the last year I have made some experiences which in the most singular manner confirm this practice. From an observation made by Benjamin Franklin—that the most humane and rapid mode of slaughtering animals for food would be by a powerful electrical discharge—I was led to try if this really were a practical suggestion. I therefore had sheep taken to the Polytechnic Institution, and had them killed by a discharge from the great battery there. I found that full-grown sheep could be fatally and instantaneously struck down by the discharge from a surface of a Leyden battery of ninety-six feet. But here came the curious fact: when animals struck in this manner were laid on the bench after the shock, apparently dead, and actually dead if let alone, they would show the most convincing evidence of recovery if they were instantly bled freely from the neck. After the blood had flowed for a little time, the animals began again to breathe; they struggled as they do when they have not been struck, and they became so distinctly conscious that I had to give up the notion of recommending any change in the present mode of slaughter. In another case, where a smaller animal was struck down and rendered apparently lifeless, the opening of the external jugular vein was followed by a gush of blood, by immediate return of the respiration and rapid recovery.

The *rationale* of the treatment in these cases is most simple. The effect of the lightning, or of the electrical discharge, is to create expansion of the contents of the venous reservoir; there is liberation of gases from the blood; distension of veins in all parts; pressure on the brain in the closed cavity of the skull, and insensibility as the result of the pressure; distension of the right side of the heart, so that the muscular structure is paralysed; and temporary cessation of all motion and function. The opening of a vein at once relieves all this embarrassment; the heart is set at liberty to recommence its contractions; the nervous centres governing the process of respiration are relieved; and, if the derangement of the animal mechanism does not extend to actual disorganization of blood, or to severe rupture of organic structure, when no remedy would avail, the natural functions are restored, and life is saved.

I take it, then, that in cases of insensibility from lightning shock, or electrical shock, the abstraction of blood by venesection is demanded.

Sun-stroke.—In sun-stroke the conditions of disease are closely analogous, if not identical, with those induced by lightning. One of my earliest experiences—an experience that has made me hold to the thoughtful practice of bloodletting—had reference to this disorder and its treatment. A man was carried from the harvest-field to the residence of a Surgeon, a relative of mine, insensible from sun-stroke. The patient was carried in like a dead man—unconscious, powerless. He was livid, but breathing at intervals, and there was still some audible motion of the heart. The Surgeon, one of the school of Clive and Astley Cowper, and one who had no doubt as to what was the right thing to do, acted promptly. "He will recover if we can only get blood" was the remark to me; so the man was *held up by his* mates in a garden chair, a fillet was put round each arm, *and a vein* was opened beneath each fillet. At first the flow of blood was

slow, though the veins everywhere were distended to the utmost, then the stream became more determinate, and at last copious, and the result was that in five minutes the man was breathing freely, was becoming conscious, was recovering. He was simply cured straightway, was able to assist himself to walk away, and without any other touch of Medical treatment was restored to full health in a few days.

I urge, then, that in cases of severe sun-stroke, when the venous reservoir is under extreme distension, when the large tense veins offer themselves, I had almost said, to the operator, there is a condition of disease demanding abstraction of blood. In America this fact seems now to be recognised, and the practice of bleeding founded upon it, in so far as it has been carried out, has been most successful. In England, at this time, the practice is lost, and case upon case, during the heat of summer, is registered in the returns of mortality as death by sun-stroke, in which virtually nothing has been done at all to promote recovery—nothing, I mean, that is likely to be successful. Mustard, perchance, is applied to the limbs, cold to the head, a blister to the nape of the neck; a purgative, if the patient can be made to swallow it, is put into the stomach, or an injection is administered by the rectum. Of what avail these slow, these almost meaningless measures? By the side of the grand old remedy they are trifles, having neither theory nor practice to sustain them.

Cases of mechanical shock.—The teachings of the writers of twenty-five years ago, when the reaction against bloodletting set in, told greatly and effectively against the abstraction of blood after mechanical shock. It was teaching diametrically opposed to the learning and observations of centuries, but it had its way, and it has been generally adopted. It is, perhaps, not altogether bad teaching, but it is certainly too sweeping. Mechanical concussion differs from lightning-stroke and from sun-stroke in that it does not increase the tension of the venous blood. It paralyses the muscular system through the nervous system, and it is probable that after such paralysis it were best to endeavour to restore by the application of warmth and the administration of a stimulant, rather than by abstraction of blood. I would not, therefore, put forward bloodletting in such instances, although at the same time, I cannot conceal the suspicion that, in some cases, the old men were right in trying to draw blood. It is certain enough, from the history of Surgery, that the fathers of our art, coming to persons who had been apparently so stunned as to be, to common observation, dead, were successful in restoring motion of blood through the vessels of the body by drawing a current of blood from an open vein. I do not press the point, however, because we have in these days no evidence to guide us, except the *litera scripta* of the past. But there is a condition of reaction after recovery from the paralysis of shock which may call urgently for abstraction of blood. In the condition of which I speak, the heart, recovering first from the general shock, pours into the feebly-resisting capillary vessels a full volume of blood, leading to what is called congestion of vascular organs, and to secondary mischiefs resulting from congestion. In these circumstances the pulse becomes resistant, the veins full, the breathing laboured, the body hot; while the unconsciousness from the paralysis passes into unconsciousness from coma. Twice, in cases such as I describe, I have seen the abstraction of blood from a vein, until the tension of the vessels was relieved, lead to the most perfect of results; and both theory and practice bring me to the conclusion that this condition is one demanding abstraction.

This same rule would apply to cases of shock following some large Surgical operations, and this view is confirmed by Mr. Spencer Wells, who, after the great operation of ovariotomy, has several times taken blood to meet particular and serious symptoms. I asked Mr Wells to be good enough to give me a brief note on the general results of taking blood in his cases, and thus he writes:—

"As to bleeding after ovariotomy, my conclusions are that it is most useful when there is *mechanical* cause for suffering, as congested lungs and oppressed *heart, or sudden loss* of balance between heart and blood, owing

to removal of a large tumour which contained large vessels and received a free supply of blood. But when we have true Surgical fever to deal with, which I suppose is either septicæmia or pyæmia, or one of the two opposed conditions of excess or deficiency of fibrine—and I think we are making out the different forms of fever with which these different blood changes are associated—then I have always found bleeding do more harm than good; more than once it has seemed to me to be certainly the direct cause of rapid sinking."

I shall deal with the last point, noticed by Mr. Wells, further on.

Cases of Reaction from Exposure to Cold.—In cases where the body has been exposed to what may be correctly called the shock of extreme cold, we have, during reaction, a series of symptoms similar to those which follow the reaction after shock from a blow or concussion. We have the same hard pulse, tense vein, congestion. When these cases end rapidly, we usually return them as cases of acute congestion of the lungs. Well, in truth, they are attended, not with congestion, of the lungs alone, but of all the vascular organs; and when they do not terminate at once in death, but run what is called their natural course, they pass into conditions of disease—"inflammation"—of some particular organ; lung, kidney, liver, spleen. The ancients were accustomed to bleed in all stages of this condition—in which practice they were, I think, wrong. But there is one stage in which, when they bled, they were essentially right—I mean the stage of acute reaction, before there is any organic change of structure from congestion and from effusion through the distended vessels. To draw blood freely in this stage is simply to cure off-hand. I was taught this lesson of treatment from the experience of a very excellent Practitioner, twenty-five years ago. I have always followed it, when permission was allowed me; I have never seen a bad result from it; I have cured at once by it; and I have seen the worst results from the omission of the practice. It is pitiable to hear, as is constantly heard, of young, strong active people, who, by accident or Surgical operation, might lose blood without any expectation of danger, to hear of such being allowed to die from acute congestion because it is not now the fashion to take the blood (which they might lose by operation or accident without anxiety) for the direct purpose of saving their lives. These are cases, unhesitatingly, in which the conditions of disease demand the abstraction of blood.

Cases of Cardiac Congestion.—There is a class of case in which the right side of the heart is diluted and enfeebled, and in which, under some special circumstance, as exposure to cold, excess of food or drink, barometrical change, there is sudden embarrassment of the circulation, oppression of breathing, tenseness of veins, and threatened death. In these cases the veins themselves stand out so fully that you could draw a fair amount of blood without the fillet, if that were desirable; the body is dusky, the eyes injected, the mind restless, the passive oppression intolerable. It happens often in these cases that the patients are advanced in life, or, at all events, are past the meridian, and on this ground a special objection is taken towards "reducing" them by abstraction of a few ounces of blood; so they are treated with stimulants, with sedatives, with chloric ether, with a blister, and in time they may get relief. They get relief by this process—that, out of the obstructed venous reservoir, a certain quantity of fluid passes into the cellular tissue of different organs by exudation, and a certain amount of further organic disease is thus committed. In these cases it is my practice, whenever I can get the permission, at once to relieve the tension of the venous reservoir by the abstraction of a few ounces of blood from a vein. The effects have to be seen to be fully accredited. There is no exhaustion from this process, but a sense of relief from overwhelming oppression; the heart ceases to struggle against the load it could not before lift up; the dusky colour of the body clears away, and the symptoms altogether are relieved, we may say practically, at no more actual cost than would follow if the venous reservoir were allowed to empty itself by *passive transudation* of serum, and with no secondary train of evils derived *from exuded* fluid in vital organs. I knew a lady who was bled under the

condition I have named after her 80th year, and who was always relieved by the process immediately. I classify passive cardiac congestion from enfeebled right heart as a condition of disease demanding abstraction of blood.

Abstraction of Blood in Cases of Apoplectic Coma.—Our predecessors were led in all cases of apoplexy to abstract blood. They made on this point a hard-and-fast rule, and the people had such confidence in the rule that they insisted on having it carried out. A hundred years ago, a Surgeon or Physician who refused to bleed in apoplexy would have lost caste on all sides, and would probably have been considered guilty of malpraxis. Admitting that our predecessors committed some errors by this hard-and-fast line of practice, they were less guilty of error, I imagine, than we are in this day; for whereas they treated apoplexy and often cured it, we, as a rule, do not in reality treat it at all, but let it take its own course, resorting to a sinapism, a dose of croton oil, or an injection, for the sake of doing something in the right direction, but leaving the case to that most perverse of curers, *Nature*, which, in nine apoplexies out of ten, means that we leave the patient to die.

But suppose there be sudden coma, with or without convulsion, from sudden pressure on the brain, what are the means by which we can hope to relieve? If the pressure be due to exuded serous fluid in the closed cavity of the skull, our object should be to get that fluid back again into the general circulation. If the pressure be due to paralysis of vessels of the brain or to obstruction to the return of blood from the brain, our object should be to reduce the pressure, and to limit the volume of blood. If the pressure be even from actual effusion of blood, our object should be to expedite the formation of clot, the separation of serum from the clot, and the absorption of the separated serum. Does anyone think sinapisms, croton oil, or injections into the rectum are reasonable measures for these important purposes; or does anyone see anything very promising in nature of a corrective kind? Under mere nature, in such cases, as far as I know, the unconsciousness remains, the body becomes very hot, the action of the heart increases in force, the skin and the mucous surfaces exude copiously, the bronchial tubes become loaded with water, the respiration gets impeded from the accumulation of fluid, the body sinks in temperature, with recurring convulsions; and death, in continued unconsciousness of the patient, closes the chapter. Turn round to bloodletting now as the remedy, and see what it offers. Say we do not always cure by it: Well! is it not better to cure sometimes than never to cure? And what, I repeat, does bleeding offer in apoplexy? It reduces the force of the heart; it reduces the volume of blood; it leads to absorption of serous fluid, if serum be exuded; and it leads to the formation of clot, if blood be exuded. Why, so rational, so purely scientific is the process, that if it had never been discovered, and some one had now discovered it, he—the discoverer—would have been looked on as one of the greatest men of this age of Physic?—*Medical Times and Gazette, Dec.* 17, 1870, *p.* 694.

19.—ON THE MURMURS ATTENDANT UPON MITRAL CONTRACTION.

By Dr. C. Hilton Fagge, Assistant Physician to Guy's Hospital.

[In the year 1861, Dr. W. T. Gairdner published an account of the presystolic (or, as he prefers to call it, the *auricular-systolic*) murmur. Since that paper, the subject has attracted a good deal of attention at Guy's. Before describing the cases which have come under his observation, Dr. Fagge gives a brief resumé of the main characters which attach to such a murmur, which he speaks of simply as a direct mitral, avoiding the use of the word presystolic until he has more clearly defined its characters.]

1. The *first and most important*, although not an essential quality of a

direct mitral murmur is its *place in the cardiac rhythm*. It is "*pre*systolic." The "first sound of the heart" is no longer the first audible sign of the heart's waking up from its quiescence during the pause; it is *preceded* by the morbid sound or bruit.

2. The direct mitral murmur has a special *seat*. It is loudest over the apex of the heart, and is generally confined to the region of the apex. It is inaudible or scarcely audible at the base, and is very rarely carried round the axilla to the back. If the stethoscope be placed over the third left costal cartilage the natural cardiac sounds are perceived (unless there be coexisting aortic disease).

3. The *quality* of a direct mitral murmur is, in most cases, peculiar. Almost all those who have written on this subject have remarked that the "presystolic bruit" has a *rough*, *churning* (or, as Dr. Salter calls it, "*grinding*") character, which of itself enables the auscultator to suspect its nature and origin.

Indeed, I do not find among my notes the record of any single instance in which such a murmur has been a soft souffle, or musical, as is often the case with systolic mitral and other murmurs, heard at the apex of the heart. A presystolic bruit is also very frequently accompanied by a marked palpable thrill or "frémissement cataire."

This rule as to the peculiar quality of the direct mitral murmur is, however, sometimes deviated from in a way which has not, so far as I know, been noticed by writers on the subject, but which is deserving of the utmost attention on the part of the practical auscultator. The murmur is occasionally so short and sudden that it resembles rather a tone, and is in itself hardly to be distinguished from the natural first sound of the heart.

In reference to this matter let me quote some points from one case. A woman was admitted under Mr. Bryant's care with gangrene of the left leg and foot; it became a matter of great importance to determine whether there was any cardiac disease which would give probability to a diagnosis of embolism. On examination I found that the heart-sounds at the apex seemed perfectly natural. Just as I was leaving the patient I noticed that at one spot the apparent first sound was slightly prolonged; this led me instinctively to place my finger on the carotid artery. I then discovered to my surprise that this apparent first sound in reality preceded the carotid pulse by a distinct interval, and that the apparent second sound was really the first sound. The apparent first sound was thus shown to be a phenomenon of disease, a *presystolic* or *direct mitral* murmur. Upon this stethoscopic observation alone was based a diagnosis of contraction of the mitral orifice: a diagnosis subsequently verified by an autopsy. Dr. Moxon also examined the patient more than once during life, and agreed with me as to the nature and origin of the physical signs.

It is of course implied in the preceding paragraphs that we have a method of determining the exact time of the ventricular systole, and for this purpose I believe that there is no plan so satisfactory as that recommended by Dr. Gairdner, namely, feeling the carotid pulse at the same time that one listens to the heart-sounds.

The simultaneous appreciation of a pulse by the finger and of a sound by the ear is no doubt a matter of difficulty at first, and requires some special education of the senses. The most favourable subject for enabling one to acquire this little art in the first instance is a person, free from cardiac disease, in whom the heart beats slowly, at the rate of fifty or less pulsations in the minute. A few opportunities of practising on such an individual will, I believe, warrant the student in speaking with certainty as to the rhythm of any cardiac murmur, provided the rapidity of the heart's action do not exceed a certain limit.

An even smaller amount of practice will enable the observer to satisfy himself that the radial pulse follows the carotid pulse (and therefore the ventricular systole) by so great an interval that anyone who trusts to the *pulse at the* wrist for the determination of the exact time of the heart's beat *must necessarily* fall into frequent errors. The length of this interval

varies under different conditions; it is especially marked in cases of aortic regurgitation.

Hitherto, however, many physicians have been in the habit of using the radial pulse to fix the time of the heart's beat. Hence it has happened that two very different mistakes have been made. On the one hand a diastolic murmur has been regarded as systolic, and when such a murmur has been heard at the apex a case of aortic regurgitation has been mistaken for one of mitral insufficiency. Of this I have seen more than one instance. On the other hand, a systolic murmur has from the same cause been supposed to be *pre*-systolic; and this I believe to have been the reason why students have ascribed such a rhythm to many murmurs which I could not regard as otherwise than systolic. The error is one which needs to be carefully avoided, for nothing is more likely to cause doubt as to the possibility of diagnosing contraction of the mitral orifice than finding a wide mitral in a case in which a *spurious* presystolic murmur had been heard.

It has been asserted on theoretical grounds that the rigid conical tube into which the mitral valve is converted in so many cases of contraction must necessarily be unable to close, and hence that the direct mitral murmur must almost invariably be followed by a second, regurgitant murmur. The results of clinical observation, however, are absolutely opposed to such an assertion. In a very large proportion of cases in which a presystolic murmur is heard, the first sound of the heart is peculiarly clear, sharp, and ringing. It thus comes to resemble very closely the natural second sound, and this resemblance is of course strengthened by the fact that it is preceded by a prolonged droning murmur, which may easily be taken to be systolic in rhythm if the auscultator be not careful at the same time to feel the carotid pulse. I have long been familiar with the fact that I could myself easily thus mistake the "first" for the "second" sound of the heart; but I have only lately discovered that the same mistake is uniformly made by the students who have gone round the wards with me, and whom I have tested in reference to this point. When I have asked a medical ward-clerk, or even a house-physician, what he has heard on listening to a case in which a direct mitral murmur has been audible, and, even when he has known that I considered this murmur to be "*pre*systolic," his answer has constantly been, "I hear a rough murmur, and after that a sharp, clear *second* sound." But I have afterwards found no difficulty in teaching him to determine for himself, by placing his finger on the carotid artery, that this apparent second sound has in reality been the first sound.

I must say further that even when I had, by means of the carotid pulse, ascertained the systolic character of the sharp, clear sound heard in such a case, I have myself more than once found it impossible to determine the same fact by means of auscultation alone.

It is probable that the statements in the preceding paragraphs will surprise some readers, who have been in the habit of believing that a presystolic bruit always "runs up to" and is continuous with a first sound, or a systolic bruit; and that the danger of overlooking the direct mitral murmur in practice arises simply from this continuity.

It appears to me, in fact, that in many of the current descriptions of this murmur too much stress is laid on the point in question. I will not, indeed, say that an actual interval exists between the presystolic murmur and the first sound, considering how small a space of time can be ascribed to such an interval. But this opinion I will venture to express: that a presystolic murmur is very often quite as distinct from the following first sound as is a systolic aortic murmur from the following second sound; yet no one has supposed that such a systolic murmur is likely to be confounded with a diastolic murmur.

When the first sound or the systolic element of a murmur has been determined, and it has been ascertained that another murmur or part of a murmur exists in the interval between the ventricular beats, the next point is to decide whether this murmur accompanies or replaces the second sound, or

whether it is a new sound preceding the first sound—in technical language, whether it is a "*diastolic*" or a "*presystolic*" bruit.

Generally speaking, this point is very easily decided. The *pause*, during the period when the heart is at rest, separates all the sounds that accompany one beat of the organ from all those sounds which belong respectively to the beats before and after. And thus one has only to find out whether the "bruit" is separated by the pause from the following first sound or from the previous second sound. In the former case it is a "*diastolic*," in the latter case it is a "*presystolic*" bruit.

But not unfrequently the bruit is prolonged, and occupies nearly the whole pause. It may then be separated by no longer an interval from the second or (even the first) sound before it than from the first sound after it. Now if such a bruit be localised at the apex, if the second sound at the base be clear, and if the bruit be of the peculiar "churning" or "grinding" quality, it may safely be asserted to be a "*direct mitral*" bruit," and to be caused by an hypertrophied auricle forcing blood through a narrowed mitral orifice. The name of "*auricular systolic*" may also be justly applied to such a bruit, but it cannot strictly be called *presystolic*. It ought rather to be called *diastolic*, quoad its rhythm; and thus Dr. Gairdner speaks of the murmur of mitral obstruction as sometimes "*ventricular-diastolic*," as well as "*auricular-systolic*." Further on, I shall have something to say as to the way in which such a prolonged direct mitral murmur is produced. But I wish here particularly to insist on the fact that I have found great bewilderment to arise in the minds of students from the careless application of the name *presystolic* to such murmurs, occupying nearly the whole pause. There can be no doubt, I think, that this name will ultimately supplant all others as the designation for the murmur caused by contraction of the mitral orifice. But when it is used for all such murmurs without exception one ought to clearly understand and to explain that its strict meaning is departed from, and that the question of rhythm is then really overlooked and supplanted by other and secondary considerations.

To two of the considerations which come into play under such circumstances I have already referred:—the localisation of the bruit at the apex, and its peculiar churning or grinding quality. But there is yet another character which belongs to a large number of cases of contraction of the mitral orifice; this is the extreme variability of the rhythm of the heart itself, and of the murmurs which accompany its movements. The variations in question may show themselves from beat to beat. One beat may have a short murmur, evidently presystolic; the next may be preceded by a prolonged bruit, which may occupy nearly the whole pause, and might thus excite doubts as to its nature in the mind of an unpracticed auscultator. In other cases the heart is apt to change its rhythm from time to time suddenly and without apparent cause. And thus whereas during one minute each beat is preceded by a most obvious presystolic bruit, the next minute no such bruit may be discoverable. Further on in my paper I shall have to discuss this point in considerable detail. I refer to it now, because several writers have most justly laid considerable stress upon variability of the heart's rhythm as a point in the diagnosis of contraction of the mitral orifice.

Another character which is observed to belong to many presystolic bruits is that of being brought out, or greatly increased when the patient is made to undergo even moderate exertion. I have more than once found that a direct mitral bruit, which was inaudible while the patient was sitting by the side of the bed, was perfectly obvious on his or her return from walking once or twice briskly up and down the ward.

When a direct mitral murmur is so prolonged as to be in fact diastolic in rhythm, it sometimes seems as if it grew out of the second sound. At the base, the second sound is clear, or perhaps appears to be reduplicated. As the stethoscope is carried downwards the double sound acquires more and more the character of a murmur, until at the apex it becomes the harsh, churning bruit so characteristic of mitral contraction. At first sight the

fact just mentioned might appear fatal to the presystolic theory; it is nevertheless indisputable. Friedreich has already described this transition of the reduplicated second sound into a presystolic murmur in cases of contracted mitral. I have myself noted it more than once, and my observations are perfectly independent, since they were made at a time when I did not even know that a reduplicated second sound had been mentioned as one of the signs of this affection.

I have repeatedly been asked by students whether the prognosis in a case of contraction of the mitral orifice is more or less grave than in a case of any other valvular disease, and particularly than in one of "mitral regurgitation." This question, however, is one of extreme difficulty, and, indeed, can in my opinion receive no direct answer. I have already shown that the discovery of a presystolic bruit is usually made at a period remote from the patient's death, unless this be caused by some complication. But this must be taken as proving, not that contraction of the mitral orifice is comparatively unattended with danger to life, but that when dangerous it is usually obscure. Thus the prognosis of a case in which a presystolic bruit is audible would by no means be the same thing as that of a case of contracted mitral orifice. Further, the rarity of a rheumatic history in the former class of cases shows that they constitute to some extent a group apart from the rest.

A yet more serious difficulty in answering the question I have just put concerns the so-called "regurgitant mitral disease." The cases included under this head are still further than those of "contraction" from forming a homogeneous class, having a clinical history of its own. The most definite group among them seems to be that in which the mischief commences by the rupture of one or more of the chordæ; and this, I believe, is a very fatal affection. In another large group the dilatation of the left ventricle has probably much more to do with the symptoms, and even with the physical signs than the valvular insufficiency. And again, there are the cases of ulcerative endocarditis, the clinical features of which (as was shown by Dr. Wilkes in the last volume of these 'Reports') are mainly due to contamination of the blood with morbid materials.

We must conclude that presystolic murmurs were formerly generally taken for systolic. But this is not, I believe, the only mistake which was made in such cases. I cannot but think that the first sound was at the same time supposed to be the second sound. In the early part of this paper I have shown how very easily this error may be committed, and how constantly it is in fact committed by students and others; the presystolic murmur indeed bearing to the first sound very much the relation which a systolic murmur would bear to the second sound. I have since found that both Dr. Gairdner and Dr. Sanders have drawn attention to the circumstance that in these cases the first sound is apt to resemble a second sound very closely. Dr. Markham, too, in his paper on the "Diastolic Mitral Murmur" already referred to, says that he has on more than one occasion seen experienced observers mistake the first for the heart's second sound, when the action of the organ was great.

But further:—I am very much inclined to suspect that even now many of those observers who correctly diagnose the presystolic murmur in a case of contracted mitral orifice do nevertheless mistake the first sound for the second sound, believing the first sound to occur at the end of, and to be swallowed up in, the murmur, whereas it is in truth separate from it. Thus, in one of the cases already referred to, in which an autopsy verified the diagnosis, we find it recorded that "the first sound of the heart was so exceedingly feeble that it was very difficult to say in what relation this murmur (diagonised as auricular-systolic) stood to the first sound of the heart. The loudly marked second sound, however, was readily heard, and immediately afterwards the rough prolonged murmur." It may appear a very bold assertion, but I cannot refrain from asserting that the sound described as the second sound in this quotation was really the first sound of the heart.

This *point is of the more importance*, as it appears to me to afford an ex-

planation of the very great discrepancies which are met with in the different papers on this subject, with regard to the difficulty of recognising the presystolic bruit. There are some observers who maintain that it is "the most easily detected of all cardiac murmurs;" there are others who regard the diagnosis of a presystolic from a systolic ventricular murmur as "one of the most difficult tasks in the physical examination of the heart, and as often all but impossible." The discrepancies will be at once accounted for if we suppose that the observers last referred to have been endeavouring to disentangle the murmur from an imaginary first sound, which they conceived to be blended with it, and to have mistaken the real first sound, for the second sound.

In conclusion, I cannot refrain from pointing out how important a bearing the facts detailed in this paper seem to have on that physiological theory which ascribes the first sound entirely to the tension of the auriculo-ventricular valves, and which, from its simplicity, appears at first sight so attractive. On the one hand, we find that in cases of extreme mitral contraction, in which the valve is thick, hard, and almost immovable, the first sound is peculiarly short, sharp, and clear. On the other hand, we observe that the auricular systole, at a time when no valve whatever is being stretched, is capable of giving rise to a sound scarcely differing at all from the natural first sound. Are not these facts almost conclusive in favour of the view that the tension of the ventricular wall is at least as much concerned as the tension of the valve in the formation of the first sound ?—*Guy's Hospital Reports*, *vol.* xvi., 1870-71, *p.* 247.

20.—OBSERVATIONS ON PALPITATION OF THE HEART AND ITS TREATMENT.

By Dr. FREDERICK B. NUSSEY, Assistant Physician to the Hospital for diseases of the Chest, Victoria Park, and to the Hospital for Sick Children.

The frequency of the disease, and the disproportion often existing between the sensation complained of and the physical signs of disordered action of the heart, have led to the following remarks, in which the term palpitation refers only to the patient's sensation, and is thus used with its popular, though incorrect, signification.

Palpitation is one of those symptoms of a deviation from health, regarded by the subject of it with anxiety, or even with alarm, but of the nature and seat of the cause of which we only possess a slight knowledge, in so far as this consists in a structural alteration of some part of the nervous system.

A further difficulty arises from the fact that palpitation, disorderly or perverted action of the heart, and structural changes of the organ, are not always quite clearly distinguished from one another, and that a definite relationship between structural change or disorderly movement on the one hand, and palpitation on the other, is *necessarily* supposed to exist, whilst there is often no proportion between the inconvenience and pain which the patient suffers, and the signs of perverted action which can be detected by physical examination. The patient has the unnatural and uneasy cognisance of the action of his heart, and from this he seeks release, and is not unfrequently grateful for the cure of a disease of which he only knew the existence: in other words, a "beating of the heart" may be complained of when no deviation from its natural action can be detected; or there may be grave structural disease, and the most disorderly action, and yet the patient may make little or no complaint.

It is quite true that in many cases the heart *throbs* in a manner evident to the observer as well as to the patient; but in a considerable number the patient only can assert such to be the case. Palpitation is so often a mere symptom which, like pain, though quite real, varies in intensity with the individual that it may be practically regarded as the *subjective appreciation of the heart's action*. Just as a patient who suffers pain after food—"knows that he has a stomach"—is the subject of dyspepsia, so a patient who feels

the beating of his heart—" knows that he has a heart"—suffers from palpitation.

In health the heart beats with a frequency varying within narrow limits with each individual, the contractions are performed with regularity, and in definite order, best expressed by the term rhythmical. Any deviation from this state is a *derangement* of the heart's action, and affects either the frequency, order, duration, or intensity of its movements, and the knowledge of such alteration on the part of the subject of it, or even of the normal action, constitutes *palpitation*. Changes in point of frequency and of intensity, whether real or apparent, are more usually associated with sensation than those of order or duration, so that in a case of palpitation, if any physical signs exist, there will probably be increased frequency and force of the heart's contractions.

The pathology of palpitation, as of perverted movement, is at present little known. There is no doubt, however, that it is to be studied in the altered structure of the nervous ganglia and plexuses connected with the heart, the centres of the vagi and sympathetic nerves, and the base of the brain and the spinal cord.

The exciting causes of palpitations are the various attitudes of mental and bodily excitement; overwork of the heart, as in severe physical labour; mechanical displacement of the organ; certain conditions of the blood, whether naturally acquired or due to the introduction of substances from without; inflammation of the heart; reflex causes, as impressions on other organs having a nervous connection with the heart; and also certain conditions which, like those giving rise to attacks of neuralgic tic, are for the most part at present unknown.

A scientific classification of cases of palpitation is not at present possible from our slender knowledge of its pathology, and from the want of proportion between the disease and its physical signs. The following arrangement is simply one of convenience, as it throws together cases more or less resembling one another in their clinical history and progress.

(*a*) Cases occurring in persons free from structural disease of the heart, and of any organ having a nervous connection with it. Two classes of these patients are met with—the young in whom degenerative changes have not commenced, and those in middle or advanced life in whom they have made considerable progress.

1. Palpitation occurs in young persons of both sexes, but especially in women, in whom it is often associated with pleurodynia. A mild form of irritative dyspepsia, and paleness not amounting to anæmia, are sometimes present. There is a history of impaired health, often dating from the time of the commencement of the catamenia, or of some moral shock in the nature of an affliction or disappointment, and a " beating at the heart" is complained of on the least exertion or excitement. The touch detects increased force of the heart's impulse; to the ear there is augmented intensity or abruptness of the sounds, and their frequency often exceeds that of health. Usually there is no irregularity, but now and then there is an intermission, or one or other sound is reduplicated. In these cases there would appear to be exalted susceptibility of the heart to emotional impressions, or to trifling demands of extra work, such as is required in going up stairs, together with impaired nutrition of its nerves.

2. Palpitation occurring in middle or advanced life, apart from other diseases, is probably one expression of that degeneration affecting the nervous system which is at this period of life making progressive inroads on the integrity of every structure of the body. The clinical history of such cases accords with this view. The palpitation is often of long standing, and has come on gradually, appearing after some serious illness, recovery from which has been slow, or is ascribed to some heavy affliction which has impaired the health. It is more common in women than in men, and sometimes dates from the cessation of the catamenia. The least exertion or excitement brings it on: it often disturbs sleep, is essentially chronic, and is apt to recur after *apparent* cure. Physical examination reveals a weak dif-

fused impulse, irregular in force and frequency, and often with intermissions; or it may be that the action is regular, but somewhat abrupt. Usually, however, the regular, abrupt impulse of earlier life is absent. These patients are often the subjects of dyspepsia, due probably to a degeneration of some of the glandular structures of the stomach, but the palpitation will persist long after the digestion has been fairly restored by the adaptation of diet and exercise to the lessened power of the stomach.

(*b*) Cases of *distinctly* reflex origin. These are few in number, and are chiefly the results of the ingestion of food improper in quantity or quality, removal of which gives speedy relief. Probably, as our knowledge increases, this class will be largely augmented.

(*c*) Palpitation, associated with structural disease of the heart or its valves, occurs at all ages. It is not a prominent symptom of these diseases (except of fatty degeneration), in the ordinary use of the term, which includes changes of the valves, causing murmurs, obvious hypertrophy, or dilatation sufficient to lead to the grave consequences of over-filling of the venous system, and appears to be rather the effect of impaired nutrition of the heart and its nerves than of the mechanical faults of the organ. Its characters are those of the palpitation of middle life previously considered, except that it is, perhaps, less closely connected with excitement or exertion, and is often not so amenable to treatment. An abrupt throbbing impulse is more frequently absent than present.

(*d*) Palpitation is sometimes due to mechanical displacements of the heart, as by pleuritic fluid, pericardial effusion, and tumours of the chest and abdomen. The patient feels the beating of his heart; but physical evidence of deranged action is very frequently absent.

(*e*) Palpitation occurs as a prominent symptom in certain conditions of the blood, as in simple anæmia, leucocythæmia, in gout, and especially in exophthalmic goitre. It is also occasioned by the presence in the blood of substances introduced from without, as in the case of tobacco-smoking and the use of strong tea.

(*f*) The cases comprised in this group are characterised by the occurrence of palpitation in definite attacks of sudden access, and by the proportion which is preserved between the perversion of the heart's action and the patient's sensations; and also by the evidence of the disturbed innervation of organs connected with the heart. They form the transition, as it were, from palpitation to angina pectoris, and present some analogy to tic, both of the neuralgic and painless kinds. The attack commences often without obvious cause; the heart's contractions are greatly increased in frequency, intensity, and abruptness; they may be regular and violent, or exhibit the extreme of disorder. The pain may vary from slight soreness and uneasiness at the præcordia to extreme agony, associated with the impression of impending death; and a sick and faint feeling with one may, with another, become repeated vomiting and actual syncope. Griping pains in the abdomen and diarrhœa are sometimes present. Such attacks are met with in gout, exophthalmic goitre, rheumatic inflammation of the heart and its membranes, in cyanosis, and sometimes when there is no discoverable disease. That they are neuroses of the heart is rendered probable by their analogy with tic just referred to, and with those forms of neuralgia of sudden access; and this is especially the case when no changes in the heart can be detected. The very frequent, abrupt, regular action of the heart seen in an animal, as the dog, after section of the pneumogastric-nerves, recalls such cases to the mind, and prompts the question whether they may not be due to the temporary and partial suspension of the functions of these nerves.—*Lancet, Feb.* 18, 1871, *p.* 228.

21.—ON ANEURISM AND DISEASES OF THE HEART AT ALDERSHOT.

By Inspector-General LAWSON.

Rokitansky was of opinion that the first step in the production of aneurism was the disease of the inner coat of arteries commonly designated atheroma in this country, though continental pathologists seem to confine that designation to this affection in a subsequent stage, when its deeper layers have undergone fatty degeneration, and the whole begins to break up. This, he says, gives rise to consecutive disease of the circular fibrous coat and cellular sheath (the term circular fibrous coat indicates the middle and cellular sheath the outer coat of the artery), and dilatation begins, sometimes embracing the whole circumference of the vessel, constituting the true aneurism, or proceeding from a limited portion of its walls, and expanding into a pouch of variable size, constituting the saccular form. A secondary dilatation sometimes proceeds from a true aneurism, which assumes the saccular character. (Pathological Anatomy, Sydenham Society edition, Vol. IV., p. 276-8.)

With reference to saccular aneurism, he makes the following distinctions:—

"1. In most cases, the wall of the sac at its base near the opening into the artery, consists of the wall of the artery that has been everted by the aneurism, and of all the diseased coats of the artery, whilst the circular margin surrounding the opening is formed by a duplication, as it were, of the entire wall of the vessel."—"The margins of the opening are smooth and covered by the deposit; the aperture is roundish."—"This form of aneurism almost invariably occurs as a secondary formation, being seated on a cylindroid or fusiform aneurism.

"2. In some few cases the circular fibrous coat terminates sharply at the margin of the aperture in the artery. The aperture is irregular and angularly contracted, whilst the wall of the pouch above it consists of the cellular sheath, and of a deposit which projects from the contiguous inner surface of the vessel over the margin of the circular fibrous coat in the form of bridge-like plates and strings, and adheres loosely to the cellular sheath in the cavity of the expanded portion of the vessel. This appearance is observed only in small aneurisms, before they exceed the size of a bean or a hazel nut, and they commonly prove fatal by bursting. They usually occur as primary aneurisms, and in general in arteries that are only slightly and locally diseased. The aperture in the fibrous coat is obviously the result of loss of substance."

"3. In cases of similarly rare occurrence, we meet with a sharply defined bulging of the artery, filled with the atheromatous mass resulting from the disintegration of the deposit and the circular fibrous sheath. The wall is here composed of the cellular sheath."

Rokitansky considers the aneurism described under the first head "to be the result of excessive disease of the coats of the artery at a circumscribed spot. The artery bulges, and its walls then bend at the margin of the diseased tissue towards the tube of the vessel with which it forms, as it were, a duplication of the wall of the artery." Further, he says:—"The appearances considered under the second head, have undoubtedly been developed from those noticed under the third head; at all events we are unable to discover in what manner this loss of substance has taken place within the wall of the vessel, unless by the atheromatous process described under the third head. We find that the deposit and the circular fibrous coat are affected throughout and destroyed."

He continues, "We take the present opportunity of answering the question whether a rent in both the inner coats of the artery can give rise to the formation of an aneurism of this class? The belief in this mode of origin has met with almost universal accordance, although, as far as we know, the correctness of the opinion has never been proved by any one. The cavity in the neck or pedicle of these last named aneurisms has commonly been regarded as *a fissure*. *Yet, as far* as we are aware, no such rent has ever been

detected, nor have we ever found that a fissure in the inner coats of the artery afforded a basis for the formation of an aneurism."

I have been thus particular in giving Rokitansky's views, as no one would differ from him unless upon the clearest evidence, and I think this evidence is afforded by Clegg's case, detailed in the Sanitary Report of the Army for 1866, p. 552. In that instance there had been recent pericarditis, accompanied or followed by thickening in the coats of the right side of the ascending portion of the aorta within the pericardium, in the centre of which was a cavity, apparently of an abscess. This communicated with the canal of the artery by radiating fissures extending through the middle and inner coats, with abrupt edges, and at a point where there was no trace of atheromatous degeneration on the inner coat. The cavity of the abscess in this case had constituted the sac, which gave way while it was yet of very small size, but had the pericardium been adherent to the surface of the aorta at the part, the sac would have been sufficiently supported to have withstood rupture so early, and have attained a much larger size, as was found in several instances here during the year. Had Rokitansky met with a case resembling Clegg's, I cannot but think he would have modified his views as to the immediate cause of aneurism materially, and have given much less weight to atheroma than he has done. It would be going too far, perhaps, to discard the influence of this degeneration altogether, but certainly aneurism, as I have met with it among soldiers, seems frequently to exist quite independent of that form of disease of the inner coat of the arteries, and destruction of large portions of even the whole three coats may take place by an acute process, and without a trace of atheroma in the neighbourhood, as is clear from the following case:—

Private John Almond, 80th Regiment, aged 28, 10 years' service, was admitted to hospital on 8th April with inflamed tonsils, accompanied by considerable febrile excitement. The left was most affected. Matter formed in it, and on the 11th was evacuated by a natural opening in the anterior part of the tonsil, after which the febrile disturbance disappeared. On 15th at 6.30 A. M., while getting up, he was in high spirits, and, while talking to those about him, a gush of blood came from his mouth; this was florid, and a large quantity escaped, causing faintness. Cold water was applied to the chest and spine, and ice given in small quantities frequently during the day. There was no recurrence of bleeding until the morning of the 16th, when he got up contrary to order, and it returned, and he lost nearly a pint, which came away in gushes, not by vomiting or coughing. Perfect quiet was now maintained, and ice kept constantly in the mouth, and he went on favourably until the 21st, when at 3.50 P. M. a violent gush took place, and though pressure was made over the carotid immediately, he died in five or six minutes.

The last attack was preceded for a little by a peculiar sensation in the region of the heart, which induced the patient to think the bleeding was about to recur. On examination the cavity of an abscess was found behind the superior constrictor of the pharynx, about the size of a filbert; this had opened into the pharynx behind the velum by a small aperture; on the other side it communicated with the canal of the internal carotid, the coats of which were destroyed for nearly half an inch in length, and about a fifth of its circumference in width, at a point just before it turns to enter the carotid foramen of the temporal bone. The edges of the opening in the carotid were irregular, abrupt, and thickened as if they had undergone inflammation and ulceration. From what we know of the resistance of the coats of the larger arteries to ulceration, even when passing across an eroding sore or abscess, it appears reasonable to conclude that the vessel in this case was itself originally implicated, and that the resulting abscess opened through the muscle, and not that an abscess first arose there which ultimately led to the destruction of the coats of the vessel. It was a question whether the *common* carotid should be tied in this case; the difficulty in finding where *the blood* came from, and its intermittent flow, however, led to its not being done, and after death it became clear that even had the operation been per-

formed, the bleeding most likely would have recurred, owing to the free anastomosis of the vessels inside the cranium, affording a copious supply of blood, which the large breach in the carotid would have permitted it to escape on the first excitement.

In the following case there were two aneurisms, which clearly came under Rokitansky's second division, at the same time that there was thickening of the whole circumference of the vessel, and several commencing dilatations that would come under his first division, but without atheromatous degeneration at the spot.

Private Edwin Fowler, Military Train, aged 31, service 9 years, healthy in appearance, steady, temperate, and with great muscular development, went to hospital on 18th November complaining of pain between the scapulæ, which had been increasing for some days, but without cough or acceleration of pulse. Nothing unusual was discovered in the condition of the lungs, heart, or great vessels, nor was there any tenderness in the course of the spine. About 2 P. M. he become rather collapsed, with great uneasiness deep in chest, which gradually extended downwards, and at last was referred to the epigastrium. This was attended with much restlessness, and inability to remain in any particular position; breathing deep and sighing, pulse small and slightly accelerated, and latterly there was a feeling of sickness at stomach, and a sensation as if the bowels were to be moved, but nothing was passed either way. In this condition he died at 4 P. M. On examining the body the coats of the aorta at the commencement of the descending portion were found thickened for between two and three inches, and this embraced its whole circumference. On laying open the vessel at this place, two small aneurismal pouches were found about its centre, and at the inner and back part of the vessel. These were near each other, and had openings about the third of an inch in diameter, with smooth but mamillated edges. The smaller sac was about half an inch deep with its inner surface entire. The other, which could have contained a walnut, adhered to the vertebra at the back, and had given way at the lower part, and permitted extensive effusion of blood into the posterior mediastinum, both upwards, and downwards as far as the diaphragm. At several other points inside the thickened portion were slight, nearly circular, depressions of the surface, showing the resistance of the coats to the pressure from within had been insufficient, and that other pouches were commencing to form. The lining membrane of the vessel displayed moderate traces of atheromatous degeneration, many patches of which had become perforated with numerous openings, as is usual when they are wasting, but the depressions of surface above noticed were free from atheroma in any of its stages. The heart was healthy in size and appearance. The tricuspid and mitral valves were quite healthy. The aortic had slight thickening towards the edges, but were smooth and healthy in appearance otherwise.

This case shows that the inflammation which precedes the formation of aneurism may embrace the whole circumference of the vessel, and hence affords an explanation of those varieties of the disease denominated true aneurism, in which the calibre of the vessel is suddenly increased without the formation of a distinct pouch on one side, communicating with the canal of the vessel by an opening more or less contracted. Three such examples were met with among the fatal cases in the course of the year; in one of them, gunner Martin Henley, Royal Horse Artillery, who died on 7th September, the immediate cause being pleuro-pneumonia of left side, the aorta was dilated into a large pouch without any clot in it, and without any distinct sac. In the second, that of Private J. Miller, Military Train, who was also affected with disease of, and incompatency of the mitral and aortic valves, the aorta, after giving off the left subclavian, suddenly expanded into a pouch about 2¼ inches in diameter, and circumscribed portions of the walls of this again were commencing to be dilated so as to present a number of secondary pouches; there was no trace of fibrinous deposition of any of these. There was very little trace of atheromatous degeneration *in this case; the* immediate cause of death was congestion of the

lungs. In the third case, that of Private Blake, 98th Regiment, the aorta, about the commencement of the arch, was dilated uniformly to the size of a cricket ball, the inner surface smooth, and without any deposit of fibrine. There was much atheromatous deposition between the heart and sac, some of it calcified. The tricuspid valves were much thickened and incompetent, also the aortic, and the heart enlarged. The case proved fatal through congestion of the lungs and dropsy. The man's condition had been detected in India when he presented himself as a volunteer, and to the last he stated he felt no inconvenience from it.

Occasionally an instance is met with of a distinct aneurismal sac, combined with a general dilatation of the vessel at another part in the vicinity, as in the following case, which presented both features, and with a complete absence of the atheromatous deposit.

Private Joseph Abbot, 54th Regiment, aged 32 years, ten years' service, died of aneurism on 18th June. This had made its appearance a considerable time before, but being on Staff employ he did not report himself until 10th May, when it had caused absorption of the sternal ends of the second and third ribs on right side, and protruded externally. While in hospital the tumour extended up the neck as far as the thyroid cartilage, and ultimately caused absorption of the clavicle. The skin over the upper part of the tumour became thinned, inflamed, and threatened to ulcerate, when he died from exhaustion. The sac arose from the superior portion of the arch of aorta, by a large opening; it was nearly filled with concentric, and firm layers of lymph; it had given away at one point, and from this the blood escaped which had extended through the areolar tissue along the neck, here there was no attempt at fibrinous deposition. The innominata was pervious and healthy, the left carotid obliterated at its origin. The aorta was much dilated between the heart and sac, and its inner coats puckered, thickened and rough, but presented no trace of atheroma. The heart and valves were healthy.

In addition to the cases already alluded to, there were four in which sacs of some size had formed within the pericardium, and ruptured into the cavity, in all of which this membrane was adhering firmly over most of the surface of the sac; in one of these there was a second sac outside the pericardium. In another case, that of Private Neighbour, 97th Regiment, who died from exhaustion without rupture, a large sac sprang from the anterior part of the arch of the aorta, and another, the size of a walnut, was formed between the aorta and pulmonary arteries and upper part of the right auricle. It communicated with the aorta by a smooth circular opening that would admit a swan quill, half an inch above the valves. The sac was firm, and contained many layers of fibrine which almost filled its cavity, it was in short, undergoing a spontaneous cure. Another case had a sac at the commencement of the arch, which burst into the right pleura. In another there was a large sac at the arch which did not give way, but the patient died of exhaustion. In another, a sac at the end of the arch ulcerated into the œsophagus, and after death the stomach and duodenum were found distended with blood, though none had been passed from the mouth. In another there were two sacs at the commencement of the descending aorta, one of which burst into the posterior mediastinum, the blood passed downwards as far as the crura of the diaphragm, and then into the right pleura, which contained numerous large clots. In another there was aneurism involving the cœliac axis, which burst into the peritoneum. Of these ten cases there was no atheromatous degeneration in the inner coats of the aorta in three, and in one only were the aortic valves diseased. In five others the condition of the inner coat was not specially noticed; two of these only had disease of aortic valves. In two there was much atheroma, but in both the aortic valves were healthy.

There was one case in which an aneurism arose from the bottom of the sulcus behind the anterior aortic valve, and the sac was formed in the left ventricle, by the endocardium with a few muscular fibres adhering to it, and the upper part of the septum. The cause of death in this case was peculiar, and as there was another presenting much the same characters, but without complication with aneurism, it may be useful to bring both together here.

Private Thomas Pope, 1st Battalion, 20th Regiment, aged 27, service eight years, was orderly to Assistant Quartermaster-General since 10th June. He complained latterly his duties exposed him to the sun, and were harassing. For a short time before his death he seems to have felt much uneasiness in cardiac region, and to have dreaded ascending the hill from the east Infantry block to the Quartermaster-General's Office (about 70 feet elevation). On the evening of 29th February he complained of pain in the region of the heart with palpitation, but next morning took his breakfast heartily, and went to the office. At the usual hour he dined, and shortly before 2 P.M. was sent a message, when he fell down, but immediately after was able to walk to hospital with the assistance of a comrade. At half-past 2 P.M., Dr. Carter saw him, when he complained of pain in cardiac region, with great difficulty of respiration, with slight cough, and much moist crepitation over lungs. Pulse very feeble, temperature of surface natural. At a quarter to 3 P.M. the breathing was much more laborious, and there was profuse expectoration of frothy fluid, slightly tinged with blood. At 3 P.M. he was insensible, collapsed, pulse scarcely to be felt, and the froth oozed up into the mouth, and passed out of the nostrils in very large quantities; he had previously spat a quart into the vessel at the bedside. Sinapisms were applied to the chest, and ether, camphor, and brandy given freely, and latterly Silvester's method of restoring the drowned was employed, but without effect, and he died at 3.35 P.M. The fluid expectorated was alkaline with a number of blood corpuscles in it. It consolidated with nitric acid. Hydrochloric acid was not tried with it. As already stated, an aneurismal sac was found at the upper part of the septum in the left ventricle, this was about the size of a walnut, and had no deposit of lymph in it. When full the sac could not have been emptied during the period of contraction of the ventricle, and as it was protruding over the passage to the aorta, must have impeded the flow of blood into that vessel very materially. The valves and lining membrane of the aorta were healthy. The lungs were much congested, almost hepatized, and the bronchial tubes full of fluid.

The other case was that of Private A. Holdgate, 54th Regiment, which was returned as pulmonary apoplexy. This man, aged 32, was stout, muscular, short necked, and had 14 years' service. On 31st July, after dinner, while employed on fatigue duty, he felt unwell suddenly, and was removed to hospital on a stretcher at 4 P.M. He was then in a low prostrate condition, with irregular intermittent pulse, and continued in this state until about 8 P.M., when cough, dyspnœa, and frothy expectoration came on, and the latter soon presented an admixture of blood. By 11 P.M. the chamber pot was half filled with a thin serous-like fluid, frothed on the surface like soap suds. As this coagulated firmly with nitric and with hydrochloric acids, it was evidently chiefly serum, with but little mucus in it. The dyspnœa at 1 A.M. was extreme, with great thirst, the stomach rejecting everything as soon as swallowed. Pulse 120, temperature 56. Shortly after three the cough and expectoration gradually ceased. At 7 A.M. he became insensible, and died about three quarters of an hour afterwards. At first a mustard emetic was given, and a large sinapism applied to the chest, and ammonia and ether frequently administered. After the cough commenced turpentine fomentations to back and front, with the stimulants and brandy, were employed assiduously, and warmth applied to the feet. The body was examined 10 hours after, when the rigor mortis was well marked, and there was considerable livor of the back (depending) parts. White froth issued freely from the mouth and nostrils, and on compressing the thorax a continuous stream welled up. On incising the skin the veins bled freely. The heart was somewhat hypertrophied and dilated, valves healthy, walls with a good deal of fat. Right side full of fluid blood. Left ventricle contained a feebly coloured clot attached to its anterior wall. Right pleura firmly adherent throughout. Trachea and bronchial tubes full of frothy serum. Lungs, especially, right, much congested, but every portion floated in water. No other indication of disease in them.

The *symptoms in the first of* these cases might have been attributed to

the impediment to the circulation caused by the aneurism, but for the immediate occurrence of the other in which no such obstruction existed; it seems very probable, however, that the extremely rapid course of the disease in Pope was determined by this complication. The weather had been very hot up to 22nd July; on 23rd the maximum was 72·4° only, and it was not above 80° for the rest of the month, except on 27th and 28th, when it rose to 89·4 and 85·4 respectively, but on 29th was 72·8 only. The excessive discharge of serous fluid from the lungs bears some analogy to what is described as occurring occasionally in sun-stroke but (independently of the cases occurring after the temperature was much reduced) it was not preceded or accompanied by the dryness and excessive heat of skin, or by the other symptoms characteristic of that disease. There was a disposition to cholera at the time these cases presented themselves, and, on 13th August, a man of the 2nd Battalion 6th Regiment actually died of that disease. I am not aware that a connection can be established between them, but in the absence of any trustworthy explanation of the causes of the former the coincidence may be mentioned.

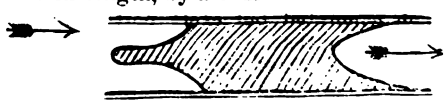
There was an instance of aneurism of the pulmonary artery, a very rare form of disease, and the first I have heard of in the Army.

This occurred in Schoolmaster Sergeant James Thane, 98th Regiment, aged 27, who had complained of hoarseness and occasional dyspnœa for about six months before death, but for which no perceptible cause had been detected. On 2nd September he was found dead in bed his head hanging over the side, and a large pool of blood on the floor that seemed to have flowed from the mouth and nose. An aneurism of the pulmonary artery, the size of a pigeon's egg, was found, which had burst into the left bronchus, by a circular opening two lines in diameter. The sac contained dense layers of fibrine. The bronchial tubes on the same side were filled with blood, but the lungs were otherwise healthy, and there was no valvular disease of the heart.

There were two cases of popliteal aneurism under treatment, which were cured by pressure, and both men have since returned to duty. The subject of one of them was Troop Sergeant-Major Henry Wadeson, 10th Hussars, aged 30, and with 13 years' service, a stout healthy looking man. His horse fell with him at the Curragh on 6th May. Immediately after he marched for Aldershot, and on 12th he felt a sharp pain in left ham, with stiffness of limb, but he continued with his troop until he reached this station. On 6th he came to hospital, with a well defined aneurism as large as a hen's egg; pressure was applied to the femoral artery in front of the thigh, and the pulsation ceased in 70 hours. The limb remained stiff and weak for some months, but he has latterly been able to resume his mounted duties.

The other case of popliteal aneurism occurred in Private J. Dillon, 97th Regiment, aged 30, and 10 years' service, eight of which had been in India. This man was healthy in appearance, but of intemperate habits. He was admitted on 8th November with aneurism in left ham the size of a hen's egg; he had experienced stiffness, numbness, and cramps in the leg for a fortnight before, but was not aware of having injured it in any way. Pressure was applied over the femoral artery in front of thigh, and continued with intermissions until the 20th, when the pulsation ceased, and the swelling then diminished rapidly. The man was discharged to duty on 8th December, and has continued at it since, unless when in confinement.

During the year there was an opportunity of examining the condition of the artery in a man who had had aneurism at the junction of external iliac and femoral on left side, some years before, which had been cured by the pressure of a 4 lb. weight over the femoral below its site, while on detachment in New Zealand. The subject, Private Charles Carlton, 43rd Regiment, died of dropsy, depending on tricuspid incompatency, on 27th March. The canal of the artery was completely obstructed under Poupart's ligament, for about 1¼ inches in length, by a firm fibrous material in this manner—



The coats of the vessel could not be separated from this plug on the one hand, nor from the sheath on the other, the whole being matted together by extremely firm fibrous tissue. There were no distinct remains of a sac perceptible.

From the above details I think it may be concluded that when the dilatation of the vessel is uniform, embracing all its coats, there is little or no chance of fibrinous deposition, and of a natural cure; but, on the other hand, unless secondary sacs form, the simple dilatation seems not disposed to extend indefinitely, and to involve risk to life, so that such cases, as instanced in Private Blake, 98th Regiment, may run on for a long period without the individual experiencing much inconvenience, and even allowing of his undergoing considerable exertion if the heart be not affected.

As soon as a distinct sac is formed, whether directly from the artery, or from a true aneurism, there is a tendency to the deposition of fibrine, and under favourable circumstances as to rest and diet, that will proceed quickly and may ultimately lead to a complete cure. In the case of Boddy, 54th Regiment, the deposition of fibrine was particularly rapid after he was placed in bed, and the size and pulsation of the tumour diminished, and, had the sac not given way so as to permit of extravasation along the neck, there seemed every hope of a cure. The case of Neighbour, 98th, in whom a small sac, within the pericardium, was almost completely filled with dense fibrine, shows that even in that most dangerous situation a cure is not to be despaired of. Of course the facility for deposition, and the probability of a cure, will be greater when the opening into the sac is small than when it embraces a larger portion of the calibre of the vessel. When the arterial coats have given way by a rent, and the blood is effused into the neighbouring parts without the intervention of a sac, the chances of a cure, unless the artery itself be secured both above and below the part, are extremely small. Rokitansky indeed says, that inflammation of these sometimes ensues, leading to a deposition of fibrine around the extravasation, and so forming a sort of sac, but this occurs so rarely that the probability of its taking place in any given instance cannot be regarded as of any practical value.—*Mr. Lawson's Pamphlet, p.* 6.

DISEASES OF THE ORGANS OF RESPIRATION.

22.—ON THE VARIETIES OF TUBERCLE, AND THE RELATION OF TUBERCLE TO INFLAMMATION.

By Dr. W. Moxon, Assistant Physician and Pathologist to Guy's Hospital.

Although some tubercles are comparatively yellow and opaque, and some comparatively grey and pellucid, yet it is wholly futile and wrong to suppose that tubercles can be divided into yellow and grey; and to know this will greatly help us in considering the rights of the contest between those who have affirmed and denied their identity.

The question in discussion in reference to grey and yellow tubercle has been this: Are they only stages of the same thing, or are they distinct kinds of tubercle? Those who hold them to be stages, pointing to the fact that in the same lung you see yellow tubercles, and below these, grey tubercles, with yellow centres, and yet below these, grey tubercles. They thought this showed that in spreading down the lung from above, the newer tubercles are found commencing grey, and the older ones are growing yellow in their central older point, while the yet older ones above these are quite turned yellow. On the other part, the holders of the belief that the grey and yellow tubercles are different in kind, are driven or drawn to this belief by the greater impression they receive from a fact equally true—namely, that in examining different cases you find in

some the tubercles all to have a prevailing yellow colour, while in some other cases they have a prevailing grey colour.

Now, in asking this question there are really three distinct questions asked confusedly ; these are—1. Does grey tubercle ever turn yellow? 2. Does grey tubercle ever not turn yellow? 3. Does yellow tubercle ever appear without being grey at first? Look carefully at each of these questions. An affirmative answer must be given to each. No doubt grey tubercle does turn yellow at its centre. No doubt grey tubercle does not sometimes so turn yellow. And no doubt tubercle is sometimes yellow from the first.

To understand how this is, we must see that there is another element, which those who treat the question as an alternative between stage and kind leave out of consideration. This element is the element of *intensity*. A yellow tubercle may be an older tubercle than grey, or a different kind from grey; or it may be a *more intense tubercle than grey*. Let me dwell on these points a little more. I stated that the question asked in reference to these celebrated two forms of tubercle is practically this question: Is the grey a stage of the yellow, or is it a different kind?

Now, I want you to see plainly that there is yet another sort of difference, besides these of stage and kind, and that sort of difference is—difference in degree. We said that grey does soften into yellow, and that it does not soften into yellow; and that the yellow comes without it. Now, the first of these propositions would argue an identity of kind, but the second and third appear at first to militate against the supposition of identity in kind. Are they really opposed to the supposition of identity in kind? No ; because the absence of a grey stage is due to high intensity, the presence of a grey stage to low intensity of the tubercle—a lower or higher degree, not a different kind ; just as in inflammatory lymph we get a plastic, pellucid, greyish matter, called "plastic lymph," or a yellowish opaque, solid or liquid substance, called "puriform lymph," or pus. We know in the case of lymph and pus that their difference is one of intensity, because we are able ourselves experimentally to determine the production of one or other by graduating the intensity of cause. If you draw a thread soaked in croton oil through the testis of a dog, you get the production of pus, and some gangrene perhaps; if, instead of croton oil, you use a thread either clean or with some less irritating substance on it, you get a less and less degree of inflammation, according as it is a less and less irritating substance that you employ. And hence you recognise purulent and gangrenous as the extreme severity of inflammation, and the plastic as a lower degree of the same. Or, if you proceed another way in the judgment of these relations, you will find, on examining, that at the focus of irritation you get the production of pus, while a grey plastic lymph is produced further from the focus ; so that, when the pus is fully formed, the grey plastic matter organises to form a sac, and encloses the pus.

These facts prove beyond doubt that the plastic lymph in inflammation is the same thing as, but lower in intensity of causation, than the pus. Now, we are not able to cause tubercles in this way directly by graduated degrees of causation, but analogy will, I think, convince us that the yellow and more pus-like tubercle is an intenser one than the grey or more lymph-like tubercle. And there is more than analogy in support of this, for the severer and more rapid the tuberculisation of the patient, the more yellow is the tubercle found to be. And again, on quite another hand, the yellow tubercle is destructive of the substance it occupies to a greater extent than the grey, in which you generally still see remains of the tissue ; while, again, further, the elements of the grey tubercle, like those of plastic lymph, show more or less tendency to elongate and organise. If we are right in using this simple analogy, and rightly use it, it clears a way to remove all the difficulty.

But if it be found that a yellowness supervenes on the grey tubercle as a *result of* oldness, and that, on the other hand, a severity of intensity *produces* a yellowness in the tubercle not preceded by greyness, it may be

fairly asked—Is the yellowness which comes from oldness of the grey, the same yellowness as that caused by severity in the originally yellow tubercle? This is a question of fact to be settled by observation. You will find, I believe, after examining specimens very carefully, that the yellowness of grey tubercle is a fatty degeneration of, and a breaking up of, the elements of grey tubercle. These elements you will find to be not quite the same as those of the originally yellow tubercle; they are often elongated and tending to form fibres, which may unite together and produce true tissue, so that some grey tubercles in this way reach a healed condition, the tissue so produced assimilating in the lung to the nature of pulmonary fibre, which is elastic. The little knot becomes horny, and the tubercle is then said to be "cornified." This drawing shows the result of such cornification. The grayer the tubercle—that is, the more lymph-like—the more chance of this occurrence. I have already said there are all degrees of greyness towards yellowness. Now, the yellow change in this grey plastic fibrillating tubercle produces fatty degeneration of these more fibrillar elements, at last breaking down to pulp, while the yellow tubercle is from the first composed of round cells with no plastic tendency to elongation, but very early becoming fatty. This tendency to fattiness in either case is the cause of the yellowness; but in the grey tubercle the supervening fattiness comes more slowly over its longer-shaped and better-lived plastic elements, while in the yellow it comes more swiftly over its round and pus-like aplastic elements, these never showing tendency to elongate, but being round and pus-like; yet even these elements are at first not fatty, and a small zone of grey colour can with care be always detected around the yellowest of tubercles. Thus, then, the yellowest of the late stage of grey, and the original yellowness of yellow tubercle (which we see is also a late stage, but so quickly reached as to be practically original), are the same yellowness, in that both are due to fatty degeneration and consequent opacity; but, in that the things that so change yellow are not quite the same in structure, the slowly faded grey tubercle has certain difference from the quickly faded yellow; but, further, in that the difference between the slowly faded grey and originally yellow elements is one of intensity of cause, they are not different kinds of tubercle. So, I think, the truth seems to be this way—that grey becomes yellow tubercle, and yellow tubercle arises without grey (evidently) preceding; but the yellow tubercle which comes on upon the grey is not quite the same as the yellow tubercle that originates yellow. Yet the yellowness is of the same nature, in either being only fattiness. But the difference between them is made by the nature of the things which become yellow by fat; which things in the greyer tubercle are, on the average, more elongated, in the yellow tubercle more rounded, the elongation and roundness of element being in their turn parallel in nature to the like varieties of form in elements of common inflammatory lymph, and by analogy and by direct evidence shown to be, as in the case of lymph, the results of less or more intensity of action in the cause of the disease.

Pray observe that the difference in regard of yellowness is only one of degree; the tubercles that are apparently originally yellow always and invariably have a short stage of greyness, this stage not showing itself all through the tubercle at one time—for, little as it is, the tubercle is a spreading, growing thing—but showing itself in the outer zone, which is last produced and youngest, and which, as I said before, is always grey, however narrow it may be.

So much for the relation of grey and yellow tubercle; now as to the relation of this to inflammation. If you see only small tubercles in a lung, you are content to say they are tubercles, and leave out of account the question of inflammation. They are tubercles, and you would no more care to inquire whether they are, nevertheless, inflammation than you would care, having recognised a psoriasis, to ask whether it was an inflammation. It is a psoriasis. But in some cases you find that, though some tubercles are small knots of firmish consistence, you see in the same lung other patches of larger size, and

others yet larger; so that from the little tubercles to the larger patches there are intermediate gradations. Now, the larger patches are granular, and sink in water, and are softish, breaking down easily when pressed, and exuding a yellow-looking opaque juice when so crushed down—and, in short, they have all the qualities which characterise the so-called grey and red hepatisations of the lung in acute pneumonia. Then arises a great difficulty—for the tubercles have pneumonia in such a relation that you cannot but see that the one is the cause of the other.

I say you have pneumonia with the tubercle; and, indeed, there is no doubt that the characters (in the cases which I am referring to) and state of the larger masses are, in all essential points, the same as those in pneumonia arising from other causes.

Now, you cannot think the pneumonia indifferent to the tubercle: you must allow some relation between them; and these are the questions that arise—1. Does the tubercle *cause* the pneumonia, as one thing causes another and a different thing? 2. Does the tubercle *become* the pneumonia, by expansion of its area and diffusion of its influence over greater space in a less time?

Those who hold the first view will say the tubercle has *set up* a pneumonia. Those who hold the second view will very likely, when pressed, say that the patch of pneumonic-like formation is "*really tubercle*," a patch, not of pneumonia, but of soft "diffuse tubercle." Now, if these two views are allowed to conflict against each other, so that one is made to contradict the other, each makes the other absurd to its own satisfaction, and goes away overmuch satisfied with itself.

For, if we look disinterestedly at the question, we shall see that its solution lies here—*that there is no such thing as the pneumonia or common inflammation, which is so easily assumed to be at hand* by those who would hold the first view, and say that tubercles set up that simple pneumonia. All pneumonias have their habits; there is no common pneumonia which has no special habits. There is no simple pneumonia to which other pneumonias stand in such relations that their peculiarities are additions to the characters of simple pneumonia, which simple pneumonia waits to apply itself around indifferent causes. The stock of simple pneumonia is plentiful in theory, but you do not find it in real lungs. In real lungs all pneumonias have their distinctive characters. *Every inflammation is intensely specific.* It is very much with it as with the tribe of cats. The lion and tiger are not common cats with additional lion and tiger peculiarities, any more than common cats are lions and tigers with common peculiarities. If we look over the pneumonias that occur in a year, we find that no pneumonia has the characters and distribution of the tuberculous pneumonia except tubercles be present with it—that is, *except it be a tuberculous pneumonia.* It is quite a peculiar thing, and its characters, so far as they vary from the characters of other pneumonias, vary towards the characters of tubercles, and in any lung vary indefinitely towards those characters, so that at last you find them to be tubercles. I shall be told that Magendie and others have put mercury into the lungs, and made artificial tubercles with surrounding common inflammation. But I beg to say that I could easily have seen that these were not tubercles, and am quite willing to challenge anyone to deceive me with such productions—they are only naked-eye-deceiving models of tubercles. Besides, he never made anything like the expanded formations of pneumonic phthisis, of whose graduation into tubercle I have been speaking; nor can they be made. He produced the pneumonia of mercury's irritation, which is a different-looking pneumonia, and a different pneumonia from phthisical pneumonia.

In this discussion of the question, I have purposely avoided using the term inflammation. I have used the word pneumonia, because it will probably carry with it the signification of the produced matter due to the inflammatory change in the lung. From what I have already said on hypertrophy, you know what I should say if the question of inflammation is *brought* as an alternative to tubercle. I should say the question is an un-

meaning question—it is not right to say a stupid question; it asks what cannot be answered, unless you mean by it—Did the phenomena of pain, heat, swelling, &c., which are the true and only meaning of inflammation, accompany the tubercles? This they certainly do sometimes; perhaps always. It is affirmed, I believe correctly, that *the formation* of tubercle always goes with an augmented heat of the body, ascertainable thermometrically.

The formation of a tubercle is as much inflammation as the formation of a herpes or a lichen, and as little; and as you get an inflamed lichen or psoriasis, so you may get an inflamed tubercle. In the case of the cutaneous disease, you would think anyone trifling with your time if he should ask whether the inflamed psoriasis is a psoriasis *plus* an inflammation; and so I think you should think of anyone who asks the question in reference to tubercle. It is as much tubercle as it was before when it is inflamed; but now it is so intense that the phenomena of pain, &c., the vital reaction to excessive change, are brought out along with the vascular phenomena which evince, characterise, and indeed create them—which vascular phenomena are the old and present and future import of the word "inflammation"—the subjects of the treatment directly addressed to inflammation, and the causes of such phenomena, additional to the cell-production of the tubercle, as are due to the vessel dilatation, blood stagnation, fluid oozings, &c., that the vascular reaction or inflammation brings to pass.

I will conclude this lecture with an analogy which, I hope, will serve to place the relations of the various formative diseases clearly. If you asked What is light? you would be told it is vibration. If you asked what is sound? you would be told it is vibration; and so, probably, scent is vibration, while some vibrations give a sense of touch. But though your mind sees all these as vibrations, yet your senses in a way analyse the vibrations, and your eye discerns the light of its vibrations, and your ear the sound of its vibrations, and so on and on; so that your senses do a service that is in a way opposed to that of your mind, and in their way are cleverer, and certainly more practical, than your mind, which would never have found out that vibrations are light, however well it knows that light is vibrations. And no one ever did or ever will tell us what it is that, added to vibrations, makes them light, or sound, or scent. Now, it is in a very similar way that, when you ask What is *inflammatory formation?* you are told it is cell growth; and when you ask What is tubercle? you are told that it is cell growth; and so tumour, and a lot more. The viewing of these different things with sufficient eye-power by the microscope evidences this beyond doubt or question. The foundation of all these is one and the same thing—the production of nucleated cells, which grow when they are produced. This is common to them all, like vibrations to light and sound; yet the result of these growths is to produce here a tubercle, and here a patch of lymph, and there a tumour; and clinical experience—that is, the watching of the phenominal results of the cell growth—evidences the differences between them. Clinical experience, as it were, further analyses the life of cells, as the senses analyse vibrations; but what is it that, added to cell growth, makes it become tubercle, or tumour, or lymph, you do not know, and never will know. It is very likely that your mind is not able to frame the question which anticipates the solution of the problem.—*Medical Times and Gazette, Jan.* 21, 1871, *p.* 64.

23.—ON THE VALUE OF TINCTURE OF ARNICA IN THE TREATMENT OF ACUTE PULMONARY AFFECTIONS.

By C. C. Balding, Esq., Shefford, Beds.

[The use of arnica internally as a remedy was suggested to the writer by an article published many years ago by Mr. Mitchell Henry, advocating its use in irritative traumatic fever. Mr. Balding first employed it in a case of

crush of the chest between two railway buffers, and the marked effect it had in controlling the frequency of the pulse determined him to employ it more extensively.]

Bernard T., aged twenty years, a strong, muscular young man, a brick-maker, attended at my surgery, four miles from his own home, on Sept. 1st. He was seen by my assistant, Mr. P. P. Langford, who reported him suffering from acute febrile disturbance. He advised the patient to get home as quickly as he could and go to bed.

On the 3rd Mr. Langford visited him, and found that he was suffering from acute pleuro-pneumonia of the right side. Posteriorly there was dulness over nearly the whole of the lung, with friction sound and some small crepitation in the upper part. At the base of the left lung, for about two fingers' breadth posteriorly, the mischief had commenced. Pulse 100, full and incompressible; respiration not taken. Mr. Langford told me of the case before prescribing, when I advised him to give ten-minim doses of tincture of arnica, with solution of acetate of ammonia, every three hours.

Sept. 4th. I visited him. His countenance was then dusky and anxious; pulse 100; respiration 60. The physical signs of the inflammation showed that it had not extended since the previous day. To continue the medicine.

5th. Seen by Mr. Langford. Pulse 85; respiration not taken. Medicine to be taken every four hours.

6th. Pulse 80; respiration 40; countenance improved. Continue medicine.

7th. Pulse 72; respiration 32; small crepitation audible in upper part of the lung posteriorly. To take the medicine every six hours.

8th. Pulse 60; respiration 24; lung improving. Continue medicine every six hours.

10th. Pulse 50, irregular; respiration 30. He was sitting up in bed, taking a milk mess, when I visited him, and expressed himself as quite comfortable. To take five minims of the arnica three times a day.

12th. Pulse 60, irregular; respiration 24; right lung normal, except for about two fingers' breadth at base, where there is small crepitation; left lung well. To discontinue medicine.

The rapid absorption of the effused products of inflammation in this case is remarkable, but it is only what I have seen in several others. The persistent effects of the drug also are very noticeable, as I have known the pulse remain at 40 for several days after the medicine has been discontinued, and even after the patient has got about. The case of hæmoptysis is briefly as follows:—

Mr W. B., small farmer, aged sixty, came to me on the 18th of August last, and said he had coughed up, he thought, three pints of blood on the previous day. I examined his lung, and did not find any signs of extensive tubercular disease. He had been subject to winter bronchitis, and there were symptoms of an atheromatous state of vessels. Pulse 90, full and incompressible. Ordered ten minims of tincture of arnica, with fifteen of dilute sulphuric acid and syrup, every four hours. His pulse was very soon reduced, and in four or five days was down to 40, and remained so for three or four days; he got about his employment in ten days, and has had no return of the hæmoptysis.

I read a paper on the subject, three years since, before the South Midland Branch of the British Medical Association at Luton. Dr. Prior, of Bedford, then president, entered into the subject, and has since given the remedy a trial. At the last meeting of the Branch Association at Aylesbury, a paper of his illustrated by cases, was read, which spoke very approvingly of the remedy.

I may state that I used to give but five-minim doses of the drug, but since the Pharmacopœia of 1867 has contained a formula for the tincture, which is evidently weaker than that previously in use, I give ten minims. I must ask those who may be induced to give arnica a trial, not to be dismayed should *no* benefit be apparent in twenty-four hours, but to continue the medicine, *and I feel* sure the effects will be unmistakable in forty-eight hours; but I *have seldom* seen a case really get worse from the time the arnica was commenced.—*Lancet, Dec.* 885.

24.—ON THE OPERATION OF TRACHEOTOMY IN THE LATER STAGES OF CROUP AND DIPHTHERIA.

By Dr. GEORGE BUCHANAN, A.M., Surgeon and Lecturer on Clinical Surgery, Glasgow Royal Infirmary.

In both of these diseases, but more especially in diphtheria, and more manifestly when they occur as epidemics, they may exist in one of two types, the sthenic or asthenic. In the asthenic, the tendency is to cause death by exhaustion—failure of the vital powers; in the sthenic, by suffocation. You will hear it sometimes stated that, because diphtheria is a general disease—somewhat like scarlet fever—and the lymphy effusion but the local manifestation of it, therefore it is unphilosophical to propose tracheotomy in such a case; but you will remember that this operation has never been suggested with any intention of cutting short the disease, nor ought it to be performed when there is great prostration. It is in the sthenic form alone that it is admissible. And what I would urge on you is this, when you find that your patient, whatever be the original disease—croup or diphtheria—is not improving by the treatment you have been adopting; when you find that the effusion is going on to produce suffocation: when the tendency is to death by apnœa more than by exhaustion, then you ought to step in and perform tracheotomy for the purpose of preventing immediate death, and so give longer time for the patient to live through the disease and ultimately throw it off. Nay, you will find, after a comparatively limited experience, that you will be able to recognise early in the progress of a case whether the tendency is to apnœa or exhaustion; and I would be inclined to urge my own experience as a reason for performing tracheotomy in the class of cases in which it will inevitably be required, before the struggle for breath has exhausted the strength of the sufferer, so rendering the operation less successful than it might have been.

In short, let not the name of the disease deter you; but, when you find a patient clearly progressing to death by suffocation, while the vital powers are otherwise vigorous, my maxim for you would be, open the windpipe and ward off the impending death, whatever be the ultimate result: you have done your duty and saved life, at least temporarily. I admit that it is sometimes a very nice point to decide, when to interfere and when to refrain, and especially to discover when the effusion has spread down into the bronchi or bronchial tubes, in which case the operation would be useless. Percussion of the chest and the sibilant *râles* discoverable by auscultation are valuable aids to diagnosis; but there is one most characteristic sign which I find a sure and ready guide to distinguish between dyspnœa depending on pulmonary occlusion, whether congestive or bronchial, and that depending on tracheal obstruction—I allude to the observation of the respiratory movements. When the obstruction is in the larynx or trachea, the powerful attempts at respiration will be plainly visible, and their inefficacy will be evidenced by the drawing in of the costal cartilages and the intercostal spaces. When this is well marked and increasing, the pulse being moderately good, it is a proof of the vigour of the vital powers, and is a clear indication for tracheotomy.

The steps of the operation are very easily indicated, but very difficult in the performance. The great maxim is, "operate leisurely and without hurry." The patient having been put under the influence of chloroform—a very great assistance in this operation—an incision is to be made about an inch and a half long from half an inch below the cricoid cartilage downwards. Layer after layer of the cellular tissue is to be divided till the trachea comes into view. This, which is easily stated, is a troublesome matter, owing to the perpetual movements of the trachea and the bulging into the wounds of veins, cellular tissue, and in children the apices of the thymus gland, all of which must be held aside with retractors. Any vessel which bleeds must be tied; and it must be a principle that the second stage of the operation is not to be undertaken until the white rings of the

trachea are clearly seen at the bottom of the wound. A sharp hook is now to be fixed in the upper part of the trachea brought into view, and the knife plunged into it—the back of the knife being towards the larynx—and the incision made half an inch long. A pair of closed dressing forceps are now to be introduced into the slit and opened, on which there will be a violent struggle, then a forcible expiration expelling quantities of false membrane and viscid mucus; and presently the patient will lie quiet, breathing tranquilly through the opening. The silver tube is now to be introduced, and the operation is completed. The only special precaution which I adopt in the after-treatment is to order the air in the apartment to be kept moist by steam from a kettle, or by some other means.

The following case illustrates these points very well.

William S., aged 7 years, when convalescing from scarlet fever, had an attack of tonsillitis. The palate and tonsils became covered with a white exudation, and the voice became hoarse. After a few days he improved so much that there was no anxiety about him, when on the 12th January there was considerable difficulty in breathing and a hoarse barking cough. The white patch was to be seen on the tonsil, evidently extending downwards. On the 13th he continued in the same state, but on the 14th the symptoms had increased in severity so that Dr. Pirie, the medical attendant, requested me to visit him in consultation. When we saw him, however, the dyspnœa had become less urgent, so that we thought that he had a hope of recovery without operation. On the 15th all the symptoms became aggravated, and when I saw him in the evening with Dr. Pirie, it was quite evident that the struggle for breath would soon wear him out. The pulse was fair; he could swallow well; but the fits of dyspnœa were so frequent and urgent that he was tossing about, gasping, and begging to be relieved. An examination of the chest showed most clearly that the obstruction was in the larynx or trachea, and that the effusion had not extended into the smaller bronchi. The muscles were acting very powerfully, so that at each attempt at inspiration the sternum, costal cartilages, and intercostal spaces, were violently pulled inwards. The effort to inspire was evidently very strong, but there was hardly any room for air to pass; a clear indication for opening the windpipe to admit the air.

The nature of the operation having been explained to the parents, they committed the child to our care to do what we thought best for it. The assistance of my friend Dr. Smart having been procured, I proceeded to perform tracheotomy precisely as before described, and with the same result. The child, who before was tossing about in an agony of dyspnœa, was soon breathing with perfect tranquility through the tracheal silver tube.

I need not describe the progress of the case from day to day. Four or five of my students most kindly volunteered to be with the patient for the first forty-eight hours, during which time the child was never left without skilled attendance, Dr. Pirie visiting two or three times a day. The result was most satisfactory. The tube was removed on the eighth day, and after that the child made a rapid recovery.—*British Medical Journal*, *March* 4, 1871, *p.* 217.

25.—CARBONATE OF AMMONIA IN THE TREATMENT OF PNEUMONIA.

By Dr. A. Patton, of Vincennes, Indiana.

[Carbonate of ammonia has long been used in pneumonitis in its latter stages—on account of its stimulant properties; but it is probable that these constitute but a very small proportion of its remedial value. Dr. Patton has employed the remedy in ninety-six severe cases, not only in the latter stages of the disease, but from the very commencement. He finds *that instead* of increasing the febrile excitement and heat of surface, both *were greatly* reduced in a short time.]

It relieves, as we conceive, the hyperinosis and thus prevents many of the complications which are likely to occur during the progress of the disease, and that it diminishes the viscidity of the sputa, promotes expectoration, prevents embolism, and promotes the oxygenation of the blood.

If the remedy be given early in the disease, and regularly, in from five to ten grain doses, every two hours, night and day, it will, in almost every case, so limit the exudation process as not only to greatly lessen the amount of hepatization, but to insure a prompt and rapid absorption of the exudation, and occasionally it will entirely prevent hepatization, and terminate the inflammation by resolution. Upon these points I cannot be mistaken, as my observations have been extensive, and carefully made.

I have treated during the last five years ninety-six cases of pneumonitis upon the exclusive ammonia method, using no other medicine excepting that in the congestion stage I sometimes give sixty drops of chloroform to aid reaction. When an aperient is required I give sulph. magnesia. Blisters may be necessary in some cases. No alcoholic agents are allowed in any stage of the disease.

Quinia is sometimes given as a tonic in the advanced stage, and may be required to control malarial influences, but is not advisable in the early stage.

In the three years from 1862, when I first began to employ the remedy, until 1865, I pursued a mixed treatment, sometimes employing alcohol, alternating with ammonia, and some cases were treated with veratrum viride, while others received tart. ant. and calomel. It was during this transition period that I was enabled, by comparative results, and effects of remedies, to determine absolutely in favour of ammonia.—*Amer. Jour. of Med. Science, Oct.*, 1870, *p.* 374.

DISEASES OF THE ORGANS OF DIGESTION.

26.—ON AN OUTBREAK OF DIPHTHERIA IN THE OBSTETRIC WARDS OF GUY'S HOSPITAL.

By Dr. J. Braxton Hicks, F.R.S., Physician-Accoucheur to Guy's Hospital.

[In December 1869, an attack of diphtheria began first in a patient recently admitted with anasarca coupled with pregnancy. The disease extended to others, but it was remarkable that those only were seriously attacked who had had some surgical interference—these were sixteen in number.]

What connection there may be between scarlet-fever poison and diphtheria it is impossible to say. It is a curious fact, however, well known to many engaged in general practice, that after some cases of diphtheria have occurred in a house among children it may cease, and scarlatina then make its appearance. In a school, of which I have knowledge, of about forty boys three were taken ill of diphtheria, whereupon that disease ceased to appear, but was replaced by scarlatina. Numerous instances have occurred in this way. This does not prove their being of the same kind, because we know measles to occur in collections of children shortly after an attack of scarlatina; still, it is not common (as far as I am aware) that in a school the first boys attacked should have measles, and those later on scarlatina.

Be this as it may, up to the period of the case of scarlatina in our wards there was no illness like that which succeeded.

Of course it may be argued that all the cases reported were not affected by the diphtheritic influence, and this objection cannot be positively answered; but such results as are here mentioned had been very rare up to that period, nor have they since recurred. And inasmuch as all the cases occurred within a fortnight of one another, and that the first and last case had certainly diphtheria, it is a fair inference that an untoward influence derived from that source had marred that recovery which we had every reason, from ordinary experience, to expect.

It is the habit of looking so much for the ordinary symptoms of a specific poison which hinders us from recognising the untoward influence the same poison may exert in a system exposed to any lesion which requires good health for reparation. So small a quantity of baneful influence is sufficient to produce imperfect reparation of damaged tissues, and so slight is the line of separation between the tendency to good or bad recovery, that we are apt, till our attention is closely drawn to the subject, to overlook these important influences. That which one often puts down to a non-disposition to "heal" is quite as often, if not more often, dependent on the system being influenced in a less degree by a poison which in greater quantity would produce the violent forms of pyæmia. Let this be fully recognised, and careful attention will be amply rewarded by far more satisfactory results. Numberless causes of a detrimental kind surround us all, and the utmost care is required lest they affect those who require reparation of damaged parts. This is equally true in the surgical as in the lying-in room. It matters not in practice whether we believe in the living germ theory or in floating poison; but that what attacks the patient has a material existence, and is capable of being diffused, driven away, or destroyed, seems to be completely proved.

That it can enter the system either by the lungs or by the abraded surface is also clear, and that it acts more rapidly by the latter means is more than possible.

However, I have thought the narration of these cases may assist in our knowledge of the matter, and the reader is at liberty to draw his own conclusions from them.

Case 1.—A patient was admitted five months pregnant, having general anasarca, with albuminuria. After being in a few weeks she spontaneously aborted. The placenta came away well. After about five days she was feverish, and had pain in the lower part of the abdomen. On examination I found the fold between the right thigh and swollen labium covered by a large diphtheritic patch four inches long by two broad. Although this became less in extent, she every day became lower, the tenderness in the lower part of the abdomen greater, and a decided hardness felt to be within. She vomited, and had furred tongue, rapid pulse, and at the end of ten days after confinement died. The post-mortem examination showed kidney disease (Bright's) rather recent; peritonitis extensive, with effusion of lymph in left groin enclosing purulent fluid.

Case 2.—While the first patient was succumbing I removed a fragile calculus from the urethra of a woman who had just entered the hospital. She went on well for about three days, when she complained of being feverish and tender in the urethra. On examination the parts, which had been abraded, were covered by diphtheritic layer running up to the bladder. In a few days cystitis came on. To relieve her pain morphia was injected into the arm. The spot inflamed and suppurated. About three days after this a swelling over one knee came on. Matter in a day or two was found and let out. On her shoulder also the same occurred. In the mean time her constitutional symptoms became very severe, and it was evident that pyæmia was present in its worst form. As she was sinking, and her husband was anxious for her removal home, she was taken out and died shortly after.

Case 3.—At the same time this last narrated case was operated on another patient underwent a partial operation for atresia vaginæ, extending about two and a half inches, the intention being to complete it in a few days. She was, however, taken with severe feverishness, great local tenderness, and cellulitis on one side of the uterus. She remained very feverish for one month, the pulse being 110 to 120, P.M., and the temperature 100° to 102° constantly. Of course it is well known that vaginal operations are occasionally attended by diffuse inflammation, and even fatal peritonitis. Whether this were so in this instance I cannot say, but I had not had any such result before.

This patient ultimately recovered.

Case 4.—Within a few days of these cases a woman was tapped for com-

pound ovarian dropsy. The trocar went through solid portion, and though introduced twice it failed to draw off fluid. The cyst was very high up and posterior, and could not be tapped from the front even three inches above the umbilicus. She had symptoms of inflammation of the cyst throughout, and the wounds caused by the tapping became very inflamed, and a blister spread from them for an inch and a half. Decomposition of the fluid in the cyst took place, fœtid gas being largely generated, which was drawn off by the exploring trocar twice, at so high a point towards the epigastrium that it would have been dangerous to have used a large trocar in case the intestine had been in front. She lived after the tapping about three weeks. It was found that the whole tumour, which was very compound, had become inflamed, putrid contents being in the cysts.

Case 5.—At the same time another woman, with compound ovarian tumour, was tapped in the largest cyst. Suppuration of the lining membrane walls of that cyst took place, attended with constitutional symptoms of such severity that her death appeared imminent. The vomiting was incessant, and injections per rectum were employed for some days. She somewhat improved, but the cyst rapidly filled, and, when it was about a month after tapped, a large quantity of purulent fluid was drawn off. The cyst was washed out with weak iodine water, and the irritative symptoms subsided. When she was some time after again tapped pus was absent. This patient recovered.

Whether the irritation of the cyst in this case was owing to the atmospherical condition of the ward no one can pronounce, but taken in combination with others it seems to me to point to this conclusion.

Case 6. At the same time an elderly woman was under treatment with malignant disease of the bladder. She was attacked with severe sore throat and slight diphtheroid exudation, coupled with high feverishness. From this she ultimately recovered, though she subsequently died of the malignant disease. It was after dilatation of the urethra, and removal of a large bulging mass from the wall of the bladder, that the symptoms appeared.

Case 7.—Towards the termination of these cases a woman about seventy years old was admitted, suffering very severely from intense tightness of the abdomen caused by a semi-fluctuating ovarian tumour. It was considered necessary to tap her; but the contents were gelatinous lumps, to be abstracted only by much assistance from pressure and clearing of the canula. About three fourths of the contents of the principal cyst was obtained. Next day she went on tolerably well, but the opening discharged fluid. On the third day this became offensive and plentiful, producing a fœter in the ward.

The pulse was about 110, and the temperature 97°. Finding these symptoms not in accordance with the state of the cyst, and knowing that they were like the effects of diphtheria, I examined the throat, in which she insisted she had no distress. However, the whole fauces were covered with a thick diphtheritic layer.

She continued in this state, with cold skin and slow pulse, for three days, when she died, the smell from the cyst-discharge being almost unbearable, although the cyst was twice a day washed out with disinfectants.

Case 8.—About the middle of the fortnight during which this attack lasted a young woman with inversion of the uterus was placed under chloroform, and an attempt at restoration was made. It was unsuccessful, but next day symptoms of much feverishness occurred, and subsequently tenderness of uterus. Shortly after anasarca came on, with albuminuria coupled with long and severe vomiting. She ultimately died of uræmic poisoning. Recent Bright's kidney was found, and an abscess in the ovary running up the psoas nearly to the left kidney. Now, she had been subjected to the same treatment before without irritation, and it is curious that the symptoms were general at first. The kidney complication is also very remarkable.

After the death of this patient the ward was emptied of the remaining patients, and thoroughly disinfected.

It is proper also to observe that about the commencement of this attack there were some cases of malignant uterus in the same division of the ward, the discharges from which were very offensive. As the result of experience we know it is not well to keep many cases of this kind in one ward, for whenever the effluvium is powerful it has a distinctly detrimental effect on other patients.—*Guy's Hospital Reports*, 1870–71, *p.* 165.

27.—THE ACTION OF MERCURY ON THE LIVER.

That mercury does not stimulate the liver, or increase the flow of bile in any way in health, but tends rather to bring about an opposite result, was the conclusion drawn from a series of experiments on dogs, conducted by a special committee appointed by the British Medical Association. Dr. Hughes Bennett has followed up the investigation which resulted in establishing the above conclusion by the performance of another set of experiments, having for their object the determination of the question whether—as affirmatively asserted—"mercurials possess any specific power of exciting the biliary secretion, by acting on the orifice of the common bile-duct, and so stimulating the secretion, through the nerves which connect it with the liver, just as pyrethrum or vinegar stimulates the salivary glands when it is applied to the orifices of the salivary ducts." These experiments have led Dr. Bennett to conclude that the drug has no such power. Several mercurial compounds used as medicines were treated in such a way as to approximate their condition to that which they would assume when digested for a while, and then applied to the orifice of the common bile-duct. For instance, blue pill rubbed up with milk was given to a cat, which was killed in an hour afterwards; the contents of the stomach being kept for three hours at a temperature of 100° F. Some of this fluid, portions of digested mixtures of blue pill and milk and rennet, calomel and milk, and corrosive sublimate and milk, were applied to the orifice of the common bile-duct of a chloroformed rabbit at different times, without exciting the escape of bile. The same result followed the application of a mechanical irritant, acetic acid, powdered calomel, bichloride of mercury, and the two poles of an interrupted electric current, to the orifice of the duct, or of the electric current to the gall-bladder itself, or the liver. But one occurrence of practical significance was noted. When the abdominal or thoracic muscles were excited by the induced current, then a free flow of bile from the common duct occurred. Dr. Bennett denies the presence of any muscular coat in the gall-bladder, and the possibility of its being excited to contraction by reflex irritation; and concludes that mercurials are not cholagogues in any sense of the word, neither are substances that irritate the orifice of the bile-duct, but that pressure exerted upon the liver and gall-bladder by the contractions of the surrounding muscles cause the bile to flow into the duodenum; hence the value of exercise in certain bilious complaints.—*Lancet*, *Jan.* 14, 1871, *p.* 58.

DISEASES OF THE URINARY ORGANS.

28.—ON CERTAIN MORBID CHANGES IN THE NERVOUS SYSTEM ASSOCIATED WITH DIABETES.

By Dr. W. Howship Dickinson, Physician to the Hospital for Sick Children; Assistant Physician to St. George's Hospital.

[The view that a functional disorder is to be attributed to erroneous action rather than to structural change must be looked upon as not strictly *correct.* Probably all temporary disturbance of function has its source in *a transient* alteration in the solids or fluids of the body. The discovery of *Bernard that* puncture of a certain part of the medulla oblongata rendered

the urine saccharine, rendered it probable that some undiscoverable alteration in structure exists in this part of the nervous system in cases of diabetes. The method of Dr. Lockhart Clarke has enabled the writer of this paper to discover that the nervous centres are really the seat of important alterations of structure. He has carefully examined five cases.]

The results obtained in the five cases examined are briefly these: peculiar morbid changes were constantly found in the cerebro-spinal system. In all the alterations were of the same nature, and in similar situations. The earliest alteration recognised consisted in a dilatation of the blood-vessels, particularly of the arteries, with accumulation and frequent extravasation of their contents. The next was a degeneration of the nervous matter at certain points outside the swollen vessels, probably caused by the intrusion into it of blood-corpuscles. The degenerative process occasioned destruction and excavation of the tissue round the vessel. Cavities were thus produced, often large enough to be striking objects even without the microscope, which contained blood-vessels, extravasated blood, grains of pigment, and the products of nervous decay. Finally, the contents appeared to become absorbed, so that simple vacuities were left. The perivascular sheath was variously stretched and altered in character and became loaded with pigment, but it seemed that these alterations were consequent upon the dilatation of the vessel, extravasation of blood, and excavation of nervous matter.

As to their situations, the changes occurred in constant association with arteries. They were found in every part of the spinal cord and encephalon, attaining their greatest development in the medulla oblongata and pons Varolii. The excavations were generally the most marked where the blood-vessels piercing the brain were the largest and most numerous. They were frequently in connection with folds of the pia mater. The regions affected with the greatest frequency were the olivary bodies, the vicinity of the median plane of the medulla, the grey matter of the floor of the fourth ventricle, a fissure just internal to the origin of the facial nerve which lodges a process of pia mater, and a depression similarly occupied which penetrates from between the anterior crura towards the centre of the pons Varolii.

The optic thalami and corpora striata were involved, though to a comparatively slight extent. The septum of the ventricles and the white matter of the convolutions displayed the alterations in a remarkable manner. The changes especially affected the white matter, though the grey matter at the floor of the fourth ventricle and of the spinal cord are exceptions to this statement.

In the cord the most conspicuous change was the enlargement of the central canal probably connected with degeneration of tissue, of which many evidences were found there and elsewhere.

The nerve-cells of the brain and cord were generally perfect.

Such parts of the sympathetic system as were examined, namely the upper cervical and semilunar ganglia, were apparently natural.

The only constant change found in the viscera was epithelial accumulation in the liver and kidneys.

So far as the foregoing observations extend it would seem that diabetes is associated with a substantial change, which follows the arteries of the brain and cord, and comprises injection, extravasation, and destruction of tissue. From the uniformity with which such alterations were found in the five cases examined, it may be presumed that there was a more than accidental connection between the symptoms of diabetes and the peculiar state of the nervous centres. The question at once presents itself whether the lesion is a result of the change of secretion or is antecedent to it; or have the lesion and the symptom no closer connection than as the effects of a common cause?

The last hypothesis may be dismissed as unsupported by our present knowledge. If such a common cause exists, it has hitherto eluded our observation.

The association of the morbid change with the blood-vessels suggests that it may be a result of the state of the blood. We know that the blood in diabetes is altered by the presence of sugar; Is it to this that the deterioration is due? Several considerations militate against this, at first sight, probable explanation. The veins and capillaries appeared to take no share in the morbid process, though they must be equally permeated by diabetic blood, which, in the capillaries at least, is brought into more intimate relation with the tissues than in the arteries. If the changes in the tissue were directly due to the altered composition of the blood the capillaries could hardly fail to distribute its morbid influence. Beside this, the blood traverses the whole body without producing in any other organ an analogous failure of nutrition. We may probably abandon the view that the changes described are consequent upon the diabetic state of blood, and have recourse to the supposition that the nervous alterations are antecedent to, and productive of, the glycosuria.

The following considerations give likelihood to the belief that the nervous changes are primary. No organic alteration has been found elsewhere to which the saccharine state of the urine can be attributed. The changes in the brain are in their nature and situation such as physiology has shown to be capable of producing that symptom. Further, we are the more disposed to regard the condition of the nervous centres as primary by the fact that alterations similar in kind, though differing in distribution, occur as belonging exclusively to the nervous system, quite independently of diabetes. This is the case particularly in the general paralysis of the insane. Dr. Lockhart Clarke has, since most of the preceding descriptions were written, described the lesions observed in that disorder, and shown that, though differing somewhat in situation, they are of the same nature as those here described. In general paralysis the change chiefly affects the convolutions and pons varolii, leaving the lower part of the medulla and cord natural; there is also wasting of the nerve-cells. In diabetes, as has been seen, the medulla is affected throughout, the nerve-cells remaining perfectly natural.

The pathology of the nervous system is yet in its infancy. The minute anatomy of many disorders which are well known clinically has still to be unfolded. We cannot tell how far such alterations as are associated with diabetes and general paralysis are common to other cerebro-spinal disturbances. A loss of arterial tension in nerve-tissue appears to be the first recognisable step in tetanus as in diabetes, and it is not improbable that some such morbid process as has been described in this paper may prove to be a mode of nervous failure producing different symptoms, and known by different names according to its location in one part or another of the nervous structures.

The conclusion that diabetes is primarily and essentially a nervous disease accords with all that is known of its natural history; indeed, the opinion has of late years been gaining ground that the disorder is due to altered nervous action, though no structural change was known to account for it. The urine often becomes saccharine in consequence of injuries of the head, apoplectic seizures, intra-cranial tumours, and other sources of cerebral irritation. These traumatic and accidental forms of the disease, are, as we may believe, not necessarily accompanied by the grave and general lesions which have been under consideration. Several kinds of irritation, if acting in the right situation, give rise to a similar change in the urine, though often temporary, and for the most part, though not always, unaccompanied by the serious symptoms which characterize what may be termed "idiopathic" diabetes.

Diabetes in its ordinary "idiopathic" form, though sometimes hereditary, and often taking its origin in causes which are not within our knowledge, continually results from circumstances which exert a depressing or otherwise injurious action upon the nervous functions; among them may be mentioned mental disturbances, rage, grief, anxiety, and intellectual toil, and the various forms of dissipation, among which sexual excess takes a prominent place.

Causes of this nature may readily give rise to modifications of circulation in the nervous centres, and it has been shown that, as far as could be learned from the microscope, a widening or distension of the arteries is the initial change in the pathological series.

The foregoing observations concur in leading to the belief that diabetes essentially belongs to the nervous system, a consideration which must have a practical issue in modifying the treatment of the disease.—*Med.-Chir. Trans.*, 1870, *p.* 251.

29.—ON THE TREATMENT OF NOCTURNAL ENURESIS AND AN ALLIED AFFECTION.

By Dr. J. B. Bradbury, B.A., Physician to Addenbrooke's Hospital, Cambridge.

In the *Lancet* for Nov. 19, 1870, Dr. William Thompson, of Peterborough, has recorded two cases of nocturnal incontinence of urine treated successfully by hydrate of chloral. Dr. Thomson's first case was that of a girl, aged 12 years, who enjoyed perfect health, with the exception of wetting her bed every night, and of having a frequent desire to micturate in the day time. After taking one dose of fifteen grains of hydrate of chloral, the nocturnal symptoms were checked, and, after a fortnight's treatment by the same drug, the day symptoms also disappeared. The second case was that of a boy, aged 13 years, who for seven years had had nocturnal enuresis. This boy was also cured of this distressing malady after taking one dose of the medicine.

A short time after reading Dr. Thomson's note, I had an opportunity of putting this drug to the test in this affection. My patient was a girl, aged 15 years, who had wetted her bed every night for nine years. She was ordered fifteen grains of hydrate of chloral every night, and after taking the first dose of the medicine there was no return of the complaint. At the end of six weeks, she had had no relapse of her infirmity.

Being satisfied with the efficacy of this drug in nocturnal enuresis, I next resolved to try its value in a closely allied functional disorder, viz., nocturnal incontinence of semen. In many cases, both of nocturnal incontinence of urine and of semen, there is reason to believe that spasm is an important factor. As you are all aware, the bladder is furnished with two sets of muscular fibres—the detrusor urinæ and the sphincter vesicæ—the latter being the antagonist of the former. In a healthy person, these two sets of muscular fibres counterbalance each other; but under the influence of volition, as when we wish to micturate, the detrusor muscle can overpower the sphincter, which can be controlled by the will. In cases of nocturnal enuresis, the influence of the will on the fibres of the sphincter can, when the person is awake, enable this muscle successfully to oppose the spasmodic contraction of the detrusor urinæ, and thus prevent diurnal enuresis; but when the patient has gone to bed and fallen asleep, this controlling power of the will is lost, and thus the sphincter is unable to counteract the action of the detrusor, and as a consequence of this, the urine escapes from the bladder. In many cases of spermatorrhœa, also, Trousseau was of opinion that the vesiculæ seminales entered into a state of erection, like the detrusor vesicæ muscle, and that semen was ejected in consequence of this excessive contractility. It is, also, by no means uncommon to find that persons, who are troubled with nocturnal incontinence of urine in boyhood, suffer from nocturnal incontinence of semen when they have arrived at the age of puberty; and occasionally the two affections may coexist in the same person, as in a case which came recently under my notice.

A gentleman, aged 27, consulted me on Feb. 1, 1871, for nocturnal emissions and incontinence of urine. He had been troubled with the former for nine years, but had never wetted his bed before the previous night. He found the spermatorrhœa worse when in Cambridge, scarcely ever having passed a night without one or more emissions. He informed me that a brother who

died had enuresis when a boy. The patient passed urine in a good stream; his bowels were regular; he had at times severe attacks of neuralgia. His health was completely undermined by the spermatorrhœa; he felt exceedingly feeble, and unable to exert himself either mentally or bodily. He had taken strychnia and other remedies without benefit. I ordered him fifteen grains of hydrate of chloral every night, and recommended him not to drink spirits at night, which he informed me he seldom did. On February 4th, there had been no return of the spermatorrhœa or of the inability to hold his urine during sleep. On February 22nd, my patient said he felt quite well, and had had no return of his complaint, which gratified him very much, as he was shortly to be married.

My next case was somewhat similar to the above, except that there was no difficulty in retaining the urine. The nocturnal emissions also occurred less frequently, and the patient had only been troubled with them for nine or ten months. The result of the treatment by chloral hydrate was quite as satisfactory as in the preceding case; and, as a proof that the medicine was really efficacious, I may state that the patient one evening forgot to take his medicine, and the consequence was that his infirmity returned.

Whenever, therefore, there is reason to believe that nocturnal urinary and seminal incontinence are due to spasm (not the result of irritation reflected from a fissured anus, worms, urinary calculi, congenital phimosis, or of structural disease of the walls of the bladder, &c.), hydrate of chloral will be found a most serviceable drug in their treatment, in consequence of the acknowledged power of this drug of allaying spasm, as observed in tetanus and other spasmodic disorders.

If I were asked what advantages I claim for hydrate of chloral over belladonna in the treatment of these affections, my answer would be: 1. That the effect of belladonna is not so immediate, frequently taking weeks to produce any marked control over the disease; whereas the influence of chloral hydrate is most rapid, the malady frequently disappearing after the first dose of the remedy. This quick improvement cannot be over-estimated in the treatment of these affections, upon which the mind exerts a powerful influence. 2. That belladonna, sometimes induces profuse diarrhœa, a result which I have never known chloral hydrate to produce. 3. That belladonna, when pushed to the extent to which it is necessary to be really efficacious, not infrequently impairs vision, &c., which is not the case with chloral hydrate. 4. That belladonna has, in my hands, on several occasions failed to be of any service.

Of course I am aware of the fallacy of the reasoning *post ergo propter*; but, on theoretical grounds alone, I am of opinion that a more extended trial of the chloral hydrate in these affections will establish the therapeutic value which is claimed for it.

There is one other point in connection with nocturnal enuresis which has interested me very much, and that is the close similarity between this affection and epilepsy; indeed, nocturnal enuresis might, without any great error, be called epilepsy of the bladder. I will, therefore, conclude my remarks by stating the points in which I think the analogy holds.

1. Enuresis and epilepsy are both markedly hereditary, and one neurosis may be transformed into the other; patients who have had incontinence of urine in youth sometimes becoming epileptic after puberty.

2. Both affections are influenced by the same system of nerves—the sympathetic, which may, under certain circumstances, induce spasm in the muscular fibres of the small arteries of the brain, as it does in the unstriped muscular fibres of the detrusor vesicæ muscle.

3. Belladonna is of service in the treatment of both these affections, and probably acts by its influence on the sympathetic.

4. Epilepsy may be either essential or due to reflex irritation, and so may nocturnal enuresis.

I have not tried hydrate of chloral as a remedy in epilepsy; but I am of opinion that it will be found useful in the treatment of some forms of this affection.—*British Medical Journal*, *April* 8, 1871, *p.* 363.

30.—INCONTINENCE OF URINE, AND ITS TREATMENT BY A NEW REMEDY.

By Dr. JOHN BARCLAY, late Assistant-Professor of Materia Medica and Medical Jurisprudence in the University of Aberdeen.

During the past two years and a half, twenty cases of incontinence of urine have been treated by me; the medicine invariably prescribed has been syrup of the iodide of iron alone, and so far as I know there has been no failure. I have notes of all the cases, but only eleven in a completed state, since the other nine, who came from a distance, did not return to say what was the result. The probability is that they were cured, otherwise they would not have been got rid of so easily. Uncured cases are those that return upon our hands. At all events, the eleven who did report themselves, or who were continually under observation, were all cured, the improvement in several of the cases following so closely on the administration of the remedy as to leave no doubt but that the good effect was due to the syrup. I may mention that Dr. Manson, of Banff, and Dr Smith, of Kinnairdy, have both found the medicine equally satisfactory. Dr. Smith says that he tried it only a fortnight ago, in a boy who for a long time had been a sad martyr to both diurnal and nocturnal incontinence, and who had resisted all other remedies, but upon giving him the iodide, in two or three days he was all but well.

I now give shortly the eleven cases of which I have completed notes, and the first of these is that which suggested to me the remedy.

Case 1.—April 13, 1868. Helen W., aged 14 years, has impetigo of the head and face; ordered half-drachm doses of syrup of the iodide of iron three times a day, and some diluted citrine ointment as a local application. April 30. Reported cured. From this time down to June 12 she got no medicine, when the girl herself came to me, telling me she had nocturnal incontinence. In the hurry of the moment, and without asking any questions or her volunteering any statement about the duration of the complaint, I ordered tincture of iron. She continued to take this till October 9 without any benefit, when I ordered tincture of belladonna. She returned on December 2, saying this, too, had done her no good. Her mother, who accompanied her, now told me that during the time the girl took the medicine for the eruption on the head and face, and for about a month after, she had no incontinence, and that the complaint, which had existed from childhood, had defied every means tried to cure it up to that time. It had, however, returned, and she wished to get the same medicine. I ordered it as before, and on December 23 she returned to say she had wetted the bed only four times since she got the medicine. I repeated it. On February 6 she reported that she had only had incontinence twice since last date, and none at all for the last twenty days. April 1. Has not wetted the bed since last date, and only twice since December 23. I have often seen this girl since, and she has had no return up to the date of my writing.

Case 2.—Dec. 5, 1868. James S., aged 10 years, a poor scrofulous-looking creature, with cough and purulent sputa, and other phthisical signs and symptoms, no appetite; ordered iodine externally, and syrup of the iodide of iron in twenty-five-minim doses after meals (I heard nothing at this time of the incontinence). December 22. Decidedly improved; cough better, and he eats better. I was told to-day that he had laboured under incontinence of urine at night for some eight years, without even passing a night, but that since he had got the mixture he had only wetted the bed three times. To increase the syrup to half-drachm doses, and to take cod-liver oil. This boy was in a few days more cured of the incontinence, but in April, 1869, he died of phthisis.

[Nine other cases are related.]—*Medical Times and Gazette, Dec.* 17, 1870, *p.* 697.

31.—ON THE DIAGNOSIS AND PROGNOSIS IN CASES OF BRIGHT'S DISEASE.

By Dr. GEORGE JOHNSON, Professor of Medicine in King's College, and Physician to the Hospital.

Chronic Bright's disease, with the anatomical character of a large white smooth kidney, like a small red kidney, is sometimes the result of an insidiuous chronic degeneration; but, unlike it, the large white kidney is often a sequel of an acute inflammatory attack ("acute disquamative nephritis"), and we are thus enabled in some cases to determine the exact period at which the disease began. We may learn that, some months or even years ago, the patient had acute Bright's disease and dropsy; that the dropsy disappeared, but the urine never ceased to be albuminous. The history of these chronic cases sometimes extends over a period of many years. One case that came under my observation terminated fatally after albuminuria had continued for more than twenty years, one at the end of eleven years, and one after an illness of ten years. These were all cases of enlarged white kidney. Some writers have stated that the cases of chronic Bright's disease which have the slowest and the longest course are those associated with the small red granular kidney; but this statement does not accord with my experience. I have met with no cases of small granular kidney in which the disease has been known to exist for so long a period as in the cases of the large white kidney to which I have just now referred. It must, however, be borne in mind that the course of the disease which results in the small granular kidney is often so insiduous, that it may have existed long before it was recognised or suspected.

In some cases, we may trace back the probable commencement of a chronic renal degeneration to a period when the patient began to be troubled to rise once or oftener in the course of the night to pass urine. This increased frequency of micturition may be a result either of a more abundant secretion of urine, or of some abnormal and irritating quality of the secretion acting as an irritant upon the bladder. With a history pointing to the existence of a large white kidney, the condition of the urine may vary considerably. The most favourable appearances are, a natural sherry colour, with normal specific gravity, a moderate amount of albumen, absence of all sediment and tube-casts, or a light cloudy deposit containing small hyaline casts: the amount of urine secreted being about normal. As the structural changes in the kidney increase, the urine loses its natural sherry colour, and at length it may become almost as colourless as water. The measure of urine secreted varies considerably, being sometimes much in excess of the normal amount, more frequently below it. The dropsical symptoms, as a rule, bear an inverse relation to the amount of urine secreted, and a direct relation to the amount of albumen from the blood. The dropsical tendency, too, is favoured by the dry and inactive state of the skin which is commonly associated with chronic renal disease.

The gland-cells in the advanced stages may undergo a partial oily transformation, or they may be replaced by unorganised fibrine, which fills the tubes. Both these changes are indicated by the character of the tube-casts: the oily transformation by oily casts and cells; the fibrinous exudation by large hyaline casts having a diameter equal to that of the tubes in which they are moulded. When urine of pale colour and highly albuminous, deposits a copious and rather dense whitish sediment, mainly composed of large hyaline and large granular casts, we may be sure that the glandular tissues are becoming rapidly disorganised, and that uræmic symptoms will speedily occur. I know of no appearances in the urine which are of more unfavourable import than those which I have just now described. The microscopic appearances to which I refer sometimes present themselves in the more advanced stage of a case in which, at an earlier period, oily casts and cells have formed the chief microscopic sediment. This sequence of events occurred in a case which I watched from its commencement to its termina-

tion, during a period of ten years. The case was one in which a large white granular fat kidney subsequently underwent a process of atrophy and contraction, the progress of the disease in its different stages being clearly indicated by the microscopic appearances in the urine. The preserved specimens from which these drawings were taken I have in my possession, and they still retain their characteristic appearances. The disease began as an attack of acute disquamative nephritis. This passed into a chronic form of disease, with the appearance of oily casts and cells. After a period of nine years, these were associated with, and afterwards replaced by, large granular and large hyaline or waxy casts. The kidneys were much reduced in size, their combined weight being only seven ounces and three-quarters; but their appearance was very different from that of a small red granular kidney. Their cortical substance was pale, and presented numerous yellow oily granulations, showing clearly that in this case contraction of the kidney had followed upon enlargement, with fatty degeneration of the glandular tissues.

I have before stated that the urine in cases of acute Bright's disease is usually more or less tinged by admixture with blood, which probably escapes from the ruptured Malpighian capillaries. During the progress of the various forms of chronic disease, the walls of the minute arteries become hypertrophied, and those of the Malpighian capillaries gradually become thickened. Consequently, the capillaries are less liable to rupture, and the urine is rarely blood-tinged. When the urine is highly albuminous, of low specific gravity, and not only free from blood-tinge, but pale, from a deficiency of its normal colouring matters, there is reason to suspect the existence of advanced chronic renal disease. On the other hand, the appearance of dark coloured, smoky, or blood-tinged urine is, *pro tanto*, evidence of a recent acute affection of the kidney. I must warn you, however, to be on your guard against an occasional source of fallacy. It is this: in the advanced stage of chronic Bright's disease, the blood becomes much deteriorated, partly by the loss of its normal constituents, and partly by the retention of urinary excreta. There is, consequently, a tendency to hemorrhage from various mucous surfaces—from the nose, the lungs, the stomach and intestines, from the uterus, and sometimes from the bladder. The hemorrhage from the bladder gives the urine the blood-tinged appearance which it often has in cases of acute Bright's disease, when blood escapes from the substance of the kidney. You may come to a right judgment in these cases by a careful consideration of the past history, together with a close inspection of the urine. You will probably find that there are no blood-casts of the tubes, as there are when the substance of the kidney is the source of the bleeding. You may find some of those forms of tube-cast which point to the existence of chronic rather than recent acute disease: for instance, oily casts, or large granular and large hyaline casts. You may also find that the urine, when, after standing for a time, it has deposited the blood, presents the pale colour which is indicative of chronic disease in an advanced stage. When a doubt exists as to the renal disease being of recent origin or of long standing, the evidence of hypertrophy of the left ventricle of the heart, without valvular disease, but with a full and firm radial pulse, the result of excessive resistance to the passage of the blood through the minute systemic arteries, whose muscular walls are also hypertrophied—this evidence points to the existence of chronic renal disease. (Upon this point, see a paper by the author, *Brit. Med. Journal*, April 16, 1870.)

In cases of the large white kidney, the mode of death is usually different from that which is of most frequent occurrence in cases of the small red granular kidney. Uræmic convulsions, coma, and typhoid symptoms, are less frequent; while, on the other hand, an excessive dropsical accumulation, causing great distension of the skin, often results in fatal inflammation and sloughing of the integuments. In other cases, a dropsical accumulation within the chest; or engorgement and œdema of the lungs, may cause death by apnœa. In all forms of chronic Bright's disease, gastro-intestinal symptoms, vomiting, and purging, the result of the vicarious elimination of urinary excreta, may induce a fatal exhaustion.

Some recent writers affirm that impairment of vision, the result of degeneration of the retina, with or without hemorrhage into its tissue, is almost exclusively associated with the small granular kidney. It so happens that most of the cases of retinal degeneration that I have seen have been associated with the large white kidney.

In the advanced stages of valvular disease or degeneration of the muscular walls of the heart, and in cases of emphysema of the lungs, with bronchitis and consequent retrograde engorgement of the systemic venous system, passive congestion of the kidney frequently causes not only dropsy, but also albuminuria and even hæmaturia; the urine containing small hyaline and blood casts. The secondary character of the renal complication is usually apparent from the history of these cases; and the diagnosis may sometimes be confirmed by the fact that, when the circulation has been relieved by rest in bed, by hydragogues and other suitable remedies, while the physical signs of the cardiac disease remain, the albumen disappears from the urine, to return, perhaps, when the circulation again becomes more embarrassed within the chest. I have seen this happen again and again during the progress of the same case.

When, in consequence of an obstruction at the heart, the systemic veins become overfull, the distension of the renal vein, acting backwards, through the intertubular capillaries, causes engorgement of the Malpighian capillaries, and a consequent transudation of serum through their walls. This serous transudation, mingling with the urine, renders it albuminous. Sometimes the distended capillaries have their walls ruptured, and blood escapes into the tubes and tinges the urine. It is interesting to note the action and reaction of renal and cardiac disease upon each other. In one case I observed the following sequence of events. A gentleman had acute Bright's disease with anasarca, from which, after many months, he completely recovered. During the progress of the disease there was developed a systolic bellows-sound over the base of the heart—the result, probably, of uræmic endocarditis. The bellows-sound remained after all symptoms of renal disease had passed away; and in time it became a double basic murmur, with the usual physical signs of incompetent aortic valves. For some years the valvular disease caused but little functional disturbance; but at length, with increasing obstruction of the circulation, dropsy came on, and with it albuminuria from passive congestion of the kidney. Death occurred in about ten years from the commencement of the renal disease. In this case it will be seen that a primary renal disease was the exciting cause of valvular disease of the heart; and that, the renal disease having passed away, the cardiac disease ultimately caused dropsy and a secondary albuminuria, the result of obstructed circulation and passive congestion of the kidney.—*Brit. Med. Journal, Jan.* 14, 1871, *p.* 27.

32.—PERCHLORIDE OF IRON IN PARALYSIS OF THE BLADDER.

By C. H. Watts Parkinson, Esq.

On January 24, 1870, I was sent for to attend W. B., aged 74, a master blacksmith. He has for the last few years been subject to attacks of retention of urine, which have, however, hitherto been relieved by warm baths, &c., without the use of the catheter.

On my arrival, I found him suffering greatly from retention of urine, which had not been relieved by the means before used. I found the prostate enlarged, but passed a full-sized prostatic catheter, and drew off a large quantity of urine without much difficulty.

The next morning I was again obliged to pass the catheter; and the bowels being confined, I ordered a simple aperient.

Jan. 30. The catheter has been passed twice daily. There is stillicidium *urinæ, but no* power of passing water voluntarily, and the urethra is becoming *irritable.* Bowels very constipated, requiring frequent aperients.

Feb. 5. The old man is getting in a low, typhoid state. Tongue dry and brown. Pulse very feeble. A considerable amount of hemorrhage follows each introduction of the instrument. Urine loaded with phosphates and lithates, with mucus, epithelium, and some decomposed blood. Not the slightest attempt at contraction of the bladder.

6th. I drew off the urine, as usual, morning and evening, and then injected six ounces of a weak solution of tincture of iron, which I retained in the bladder for about half a minute.

7th (evening). There is a slight contraction of the bladder after the injection this evening.

8th (evening). The bladder contracts well on the instrument after the injection, and he has passed small quantities of urine occasionally during the day voluntarily, and there has been no overflow.

9th (morning). Has made water during the night. Bladder moderately empty. Urine getting better.

From this time he continued to improve, until February 18, when he could pass water better than he had done for some time.

Dec. 12. Has had no attack of retention since, and is able to pass water freely, and is better than he has been for some years, and able to follow his usual occupation.

There could be no doubt that the injection of tincture of iron effected the cure in this case, as, although the usual medicines were prescribed at the commencement, nothing more than a simple aperient was given after February 5.—*Medical Times and Gazette, Dec.* 24, 1870, *p.* 727.

38.—ON THE ACTION OF CERTAIN DIURETICS ON THE URINE IN HEALTH.

By Dr. F. B. NUNNELEY, Assistant Physician to the Victoria Park Hospital.

[Dr. Nunneley communicates in this paper the results of a number of experiments made upon himself as to the action of certain diuretics, viz., citrate and acetate of potash, spiritus ætheris nitrosi, and oil of juniper. The following are the conclusions arrived at.]

1. Citrate and acetate of potash only slightly increase the quantity of water excreted by the kidneys.
2. They distinctly lessen the amount both of urea and of solids excreted.
3. Spiritus ætheris nitrosi slightly increases the amount of urinary water.
4. It decidedly reduces the quantity both of the urea and solids.
5. Oil of Juniper slightly reduces the amount of water excreted.
6. It appreciably increases both the urea and the solids.

It would thus appear that, of these four medicines, citrate and acetate of potash and nitrous ether actually *reduce* the urinary solids, whilst they slightly increase the water, and that oil of juniper *increases* the solids whilst it slightly lessens the water.

It is evident that these experiments, performed on one individual, will not establish generally such conclusions, but they at least show that the action of these medicines, with the exception of oil of juniper, as diuretics in *health*, is very uncertain.—*Medico-Chirurgical Trans., vol.* liii., 1870, *p.* 36.

SURGERY.

AMPUTATIONS, DISLOCATIONS, FRACTURES, &c.

34.—ON SUPRA-CONDYLOID AMPUTATION OF THE THIGH.

By Dr. WILLIAM STOKES, Jun., Surgeon to the Richmond Surgical Hospital, Dublin.

[The main objects of this paper are to point out the advantages of amputation at the knee, and to discuss what is termed supra-condyloid amputation of the thigh. Amputation of the thigh was revived as an operation about forty years ago by Velpeau, who in a rather lengthy paper sets forth its various advantages. These may be briefly epitomised as follows.]

1. That the belief in the risk of exposing large cartilaginous surfaces is proved to be imaginary.

2. That after amputation at the knee the weight of the body can be placed on the face of the stump; whereas in all amputations nearer the trunk the support must be at the tuberosity of the ischium.

3. That after amputation at the knee the hip-joint preserves all its movements, and the patient need not walk as if that joint were anchyloid, as he must do after amputation of the thigh.

4. That the shock is not great, as the wound is almost entirely confined to the integuments, and no muscles of great bulk are divided.

5. That only one artery of any considerable size requires deligation after this mode of amputation.

Fifteen years subsequently, in 1845, Prof. Syme, notwithstanding the rash and indiscriminate proscription of Velpeau's operations (which were stigmatised in one of the leading surgical journals as "experimental murders"), introduced a modification of Velpeau's circular amputation at the knee, this modification consisting in sawing through the condyles and taking a long flap from the calf of the leg. The great advantages of this procedure are, that the medullary canal is not opened, that the amputation is further removed from the trunk, and also that there is less risk of the formation of the tubular sequestra, which not unfrequently occur after amputation of the thigh, and which result, in Mr. Syme's opinion, from injury to the medullary membrane or division of the nutritious artery or arteries. This operation, which appears to be identical with Hoin's, Mr. Syme subsequently abandoned in favour of Mr. Carden's method.

[The principal objection of orthopædic mechanists to this amputation is that the stump is inconveniently long, so that when the artificial knee-joint is added, it does not coincide in relative position with the other knee-joint. This objection, however, might be got over.]

The operation to which I wish to draw special attention in this paper is a modification of the procedure known in some of the Continental schools as "Gritti's amputation," which is itself a modification of Mr. Carden's amputation at the knee. One great difference between my operation and those practised on the Continent is that the femoral section is made considerably higher up, being fully half or three quarters of an inch above the antero-superior edge of the condyloid cartilage. Having made sections of a large number of femora in this situation, I can confidently *state that* the bone may be divided as high as I have mentioned, and in *some cases* even higher, without opening the medullary canal.

In the great majority of cases the medullary canal terminates at a point three-quarters of an inch above the cartilage of incrustation on the outside, and over one inch above on the inside, anteriorly. Posteriorly, one half an inch above the articular cartilage on the inside, and more than three-quarters of an inch above it on the outside, as the cartilage of incrustation is higher up in front on the outside and higher up posteriorly on the inside.

In all cases, too, the cartilaginous surface of the patella should be removed, the supposed difficulty of which has been in many persons' opinion a great one, but which, in truth, is quite visionary. The advantages to be derived from dividing the bone so high, are, first, that this method of operating ensures that the portion of the flap to which the patella is attached shall constitute the face of the stump, there being no danger when the femoral section is made so high of the patella being drawn up during the process of healing on to the anterior surface of the femur, as there is in the operation through the condyles; secondly, that the divided surface of the femur can be kept perfectly and permanently covered by the patella; and, thirdly, that by making the high section the objection I have already alluded to, of the stump being inconveniently long for the subsequent adaptation of a mechanical appliance, is obviated to a great extent, if not entirely.

In a paper by Dr. Melchiorj, of Salo, on this modification of Carden's operation, a *precis* of which is given in the "Biennial Retrospect of the Sydenham Society" for 1867-8, the particulars of three cases in whieh this operation was performed are described, but in only one of them was the articular surface of the patella removed. It would appear, therefore, that much importance was not attached by Gritti to the removal of this portion of the bone. It seems to me, however, that in order to get osseous anchylosis between the patella and femur, it is necessary to remove the posterior surface of the former, as the chances of union between the two bones taking place would otherwise be extremely limited.

The anterior flap, not rectangular but oval, should reach from a point one inch above either condyle to the other, and should extend downwards to the tubercle of the tibia. A posterior flap, at least one third of the length of the anterior one, should also be formed, as the posterior tissues retract so much more than the anterior ones; and therefore, unless a flap in this situation be made, there is much risk of a gaping wound resulting, which would greatly protract the convalescence of the patient. In making the posterior flap, the convexity at its anterior extremity should be directed backwards, so that in subsequently adapting the flaps the convexity at the extremity of the anterior should accurately fit the concavity at the extremity of the posterior flap.

It will be seen, therefore, that the differences between this procedure and the Italian operation are—

First. That the femoral section is made in all cases at least half an inch above the antero-superior edge of the condyloid cartilage.

Second. That in all cases the cartilaginous surface of the patella is removed.

Third. That the flap is oval, not rectangular.

Fourth. That there is a posterior flap fully one-third of the length of the anterior flap.

I may now proceed to give as briefly as possible the particulars of the cases in which I performed this operation, and in one of which the amputation was a primary one.

Michael Crow, æt. 32, by occupation a tailor, was admitted into the Richmond Surgical Hospital on the 7th of last January, suffering from extensive carious disease of the bones of the left leg, ankle-joint, and metatarsus. He stated that, about thirteen years previously, while playing at football, he received a kick on the tibia. The leg, he stated, "got sore" immediately, and the disease spread downwards. For more than ten years the disease was localised to the bones of the leg, being confined, namely, to about their

middle thirds. The disease then extended downwards, and about a year after the ankle-joint and metatarsal bones became involved.

On his admission into hospital, the patient had a pale anæmic appearance, and was much debilitated from the long continued and extensive disease. The leg, ankle and foot were much swollen and œdematous, and numerous sinuses existed leading down to soften diseased bone, through which purulent matter, varying as much in consistence as in quantity, continually oozed. Although there were no sinuses or other evidence of disease in the upper extremity of the tibia, I deemed amputation at the knee preferable to that immediately below the tubercle of the tibia, as from the great length of time the disease had lasted I considered it most probable that the bone in its entire extent was involved, a view which a section of the bone made subsequently verified.

On the 18th of January I performed the supra-condyloid amputation in the following manner. I commenced by making an incision with a strong scalpel, beginning one inch above the external condyle, and carried it merely through the integument downwards and forwards to the tubercle of the tibia, and then carried it upwards and backwards to a corresponding point on the inner side of the thigh. The knife was then closely applied to the edge of the somewhat contracted integuments, the deeper structures were separated, and the flap containing the patella rapidly dissected back to a point as high as where the incisions were originally commenced. The posterior flap, at least one third in length of the anterior flap, was then made, the first incision, or that through the skin, being so curved that the convexity should look backwards. The deeper structures were then divided with an ordinary amputation knife, and the rest of the posterior flap completed by this instrument. A transverse section of the femur was then made, commencing half an inch above the commencement of the antero-superior edge of the condyloid articular cartilage. The removal of the articular surface of the patella constituted the last stage of the operation, and was not attended with any difficulty. This section I find is most rapidly accomplished with one of the Lagenbeck's fine resection saws, the so-called "Stichsäge." Only one vessel, the popliteal artery, required deligation; all other arteries were secured by torsion.

I may now indicate what I believe to be the advantages of the supra-condyloid amputation over, first, the amputations through the knee-joint with preservation of the patella, those, namely, of Velpeau, Lane, Blenkins, and Markoe; secondly, the amputation through the condyles, as practised by Syme, Sir W. Fergusson, and others, operations which are closely analogous to, if not identical with, the original operation of Hoin; thirdly, Mr. Carden's operation, and its modification by Gritti; and lastly, the other amputations of the thigh, in which the medullary canal is necessarily opened.

Many of the advantages of this operation are doubtless common to it, and to the amputations suggested originally by Hoin and Velpeau: for instance, the stumps being more useful for progression in consequence of the possibility of making pressure on its extremity, and the patient not being obliged to walk as if he had anchylosis of the hip-joint, as is always the case when the point of support is at the pelvis instead of at the extremity of the stump. The diminished liability to tubular sequestra is another advantage common to all the amputations at the knee-joint. Again, the operation being further removed from the trunk, makes it less hazardous to the patient. The shock is less than in the amputations higher in the thigh, as the muscles which are divided are few in number, and these are divided, not through their thick fleshy bellies, but at their tendinous extremities. The muscular interspaces, in which suppurative inflammation so often occurs after ordinary amputations, not being opened, the chances of this occurring are at all events diminished—a point which Dr. Markoe strongly dwells on. There is less liability also to suppuration, from the fact that the parts divided in making the anterior flap are only skin and fasciæ. In connection with the *diminished liability* to suppuration, I would also mention here the fact that *the posterior surface* of the anterior flap in the supra-condyloid amputation *is covered with* a natural synovial lining.

In Carden's and all other flap amputations in this situation, the posterior surface of this flap contains the obliquely divided open mouths of innumerable arteries, veins, and lymphatics, and large numbers of which have also fenestrated openings in them as well. This peculiarity of the supra-condyloid amputation must, I am convinced, largely diminish the chances, not only of subsequent exhaustive suppuration, but also of purulent absorption. There is another feature in this operation which I believe must lessen the probability of the pyæmia. Professor Langenbeck has suggested that in amputations of the thigh the cut surface of the bone should, in order to prevent its divided vessels coming in contact with the suppuration in the wound, be covered by a periosteal curtain which, previous to dividing the bone, should be taken from the anterior surface of the femur, commencing about an inch below the point of section. As regards the value of this suggestion for diminishing the mortality of thigh amputations, having only tried it in a very few cases, I am not yet in a position to either verify or disprove Professor Langenbeck's statement on this point. I have, however, tested this plan as well on the human subject as on the lower animals, and the results of my experiments would tend to show the great liability of the periosteal curtain to slough away, and not become adherent to the cut surface of the bone. In the supra-condyloid amputation, however, we have an osseous curtain covering the cut surface of the femur which never yet has been known to slough away, so that if there be any value in Professor Langenbeck's suggestion the supra-condyloid amputation must have this among its other advantages. The preservation of the portion of the patella, to which the tendon of this powerful extensor of the thigh is attached, has, however, other obvious advantages. These are the increased power of extending the thigh in progression, and rendering the formation of a conical stump impossible. If the section of the patella be not made these advantages do not exist. In the first place because the elevated ridge dividing the posterior surface of the bone into two unequal portions effectually prevents the divided surface of the femur and patella being in perfect contact. Again, unless osseous anchylosis takes place, there can be no standpoint or firm point of fixation for the extensors to work on; and, lastly, there will always be liability to exfoliation or necrosis of the cartilage of the patella.

Lastly, there is an advantage in the supra-condyloid operation which is possessed by the ordinary circular method of amputation, and which, among other reasons, makes so many surgeons, myself among the number, in amputations of the arm and thigh cling to the circular method in preference to the ordinary flap operations, and that advantage is that the vessels are divided at right angles to their continuity, and not obliquely as they are in all flap operations, which must render these vessels more liable to take on inflammatory action from the wounds in them being necessarily so much greater in extent. I think, therefore, I may fairly claim for the operation which has been the subject of this communication, among other advantages that I have already mentioned, those of both the circular and flap amputations and the defects of neither.—*Medico-Chirurgical Transactions, vol.* liii., 1870, *p.* 175.

35.—ON AMPUTATION AT THE KNEE-JOINT.

By George Pollock, Esq., Surgeon to St. George's Hospital.

[Since 1830, when Velpeau advocated its adoption, the operation of amputation through the knee-joint has been steadily gaining in favour.]

It must be borne in mind that there are two different and distinct conditions involved in the proposal to remove the leg at the knee-joint: 1st. If there be disease of the joint with ulceration of the cartilages, amputation should be completed by the removal of the condyles of the femur and the articular surface of the patella, or the whole of that bone. 2nd. If there be no disease of the knee, but, from disease or accident amputation of the leg be *requisite, it should be* completed by cutting through the joint without *interference with the articular* surfaces of the femur or patella.

Mr Syme was one of the first in this country to encourage surgeons to view this operation as practical and comparatively safe. In 1845, he drew attention to the great mortality attendant on amputation through the thigh, and to the inconveniences of the stump which followed, often irritable, usually uncomfortable, occasionally much retracted and conical, and seldom or never capable of bearing any pressure on its extremity. Instead, therefore, of cutting through the thigh and the shaft of the femur, he amputated the limb at the joint, and removed subsequently a portion of the condyles. He justly observes that " the warrant for amputation (in diseases of the joint) lies in the bone," and not in the soft parts. By cutting through the condyles, instead of the shaft of the femur, he expected to avoid the risk of necrosis; and by cutting through the cancellated structure of the condyles, he hoped to escape those dangers so commonly attendant on opening the medullary canal. He concluded that amputation through the condyles would ever prove less fatal than amputation through the shaft of the bone, and subsequent experience tends to prove the soundness of his views.

I must here remark that whatever can be urged in favour of amputation through the condyles, may be adduced as equally satisfactory, if not as stronger evidence in behalf of amputation through the joint, without removal of the articular cartillages of femur or patella; and I trust I am justified in advancing this opinion on the strength of certain facts which are presently to be considered.

Mr. Syme, at the time above alluded to, does not appear to have made any reference to—he certainly did not then advocate—the more simple operation to which I refer. Mr. Samuel Lane, of St. Mary's Hospital, was I believe one of the first surgeons in this country to perform this operation. In 1857 he successfully amputated through the knee-joint, without removing the articular cartilage, or the patella; and so satisfied was he with the operation that he has repeated it in several instances, and with very satisfactory results.

[Since 1864, the opportunity has occurred to Mr Pollock of performing this operation eight times. Of these cases one died, a lunatic, and a most unfavourable case for operation. The result in all the successful cases was that the patient could bear the weight of the body well upon the extremity of the stump. This is not generally the case in the ordinary amputation through the shaft of the femur.]—*Med.-Chir. Transactions, vol.* liii., 1870, *p.* 1.

36.—MODIFIED CIRCULAR AMPUTATION OF THE FOREARM.

By Dr. G. H. B. Macleod, Professor of Surgery in the University of Glasgow.

In all the flap operations of the forearm there is great risk of the bones projecting at the point of union of the flaps, and this is especially the case in the lower portion of the limb, where the shape is so flat.

The method I adopt is a modification of the circular. The main objections to the circular in the forearm are the difficulty of retracting the flaps (from the conical shape of the limb) so as to allow of the bones being sawn high enough to secure a good covering and further the deep hollow left for the retention of pus. Both of these objections are overcome by making a longitudinal incision on the lower (ulnar) side from the free edge of the flap to within an inch or so of the point where the bones are to be divided. By such means complete and constant drainage is secured, the retraction of the flaps is rendered easy, and another step in the management of the stump, on which I put great weight, is rendered feasible. I allude to the application of a long pad of lint doubled over the end of the stump (after the edges of the flap have been placed carefully in apposition by sutures), and extending on either surface as high as the point of section of the bones, and clasped together (not too firmly, however) by two metal sutures passing through the flaps. In this *way the soft* parts are held accurately together throughout their whole *internal surfaces*, no hollow is left within, and yet the dependent side-cut allows *the free escape* of all secretion. The bones are deeply covered and cannot

project; and, as a rule, a rapid closure of the wound, with a firm, fleshy stump results. A piece of wet lint thrown loosely over the stump is the only dressing used, so that the progress of matters can be constantly observed.

I may here remark that the circular method of amputating does exceedingly well in the lower half of the thigh, if a longitudinal cut be made on the under surface for the escape of secretions.—*Glasgow Med. Journal, Nov.*, 1870, *p.* 8.

37.—ON SUBCUTANEOUS DIVISION OF THE NECK OF THE THIGH BONE.

By William Adams, Esq., Surgeon to the Royal Orthopædic and Great Northern Hospitals.

[Anchylosis of the hip-joint, for the relief of which the operation of division of the neck of the femur subcutaneously is now under trial, may be true or false. True anchylosis is of course a bony union, and is generally the result of strumous disease with ulceration of cartilages.]

The first operation, having for its object not only that of rectifying the deformity, but of obtaining motion by the establishment of a false joint, was performed by Dr. Rhea Barton, of Philadelphia, United States, in 1826. This operation was accomplished by a crucial incision made over the great trochanter, seven inches in length, and five inches in a horizontal direction. The bone was then divided transversely by a fine saw—it is said "between the two trochanters"—probably just above the small trochanter. The natural direction of the limb was at once restored, and the case proceeded favourably. It is said that useful motion was obtained, but that seven years afterwards anchylosis took place, and that the man died of phthisis nine years after the operation.

The next operation worthy of attention is recorded by Dr. Louis Sayre, of New York, who operated successfully on two cases in which he performed a new operation, which he had proposed for obtaining a false joint and preserving motion in cases of bony anchylosis of the hip joint, with the thigh in a flexed position. The theory of this operation was to obtain free motion by the formation of a false joint, of a ball-and-socket character, supposed to resemble the hip-joint in possessing an actabulum or cavity corresponding to this, and a rounded extremity of bone corresponding to the head of the femur ; and also a round ligament.

The operation consisted in the removal of a transverse section of the femur, of elliptical form, just above the trochanter minor by means of the chain-saw, an incision of about six inches in length being made over the trochanter major in the axis of the limb. The first patient, Robert Anderson, aged 26, was operated upon on the 11th June, 1862, and in December of the same year he is reported as follows, "Could stand on either leg without either crutch or cane"; and as late as April 29th, 1868, Dr. J. S. Green says, in a letter to Dr. Sayre, that "Robert Anderson still lives, moves, and walks with practical agility" (p. 35, pamphlet).

The second operation was performed 6th November, 1862, on Miss Susan M. Losee, aged 24. This case proceeded less favourably than the first but all discharge from the wound ceased four months after the operation. Subsequently, however, an abscess formed, and a little necrosed bone escaped. Pneumonia and pleurisy occurred, and she died on the 17th May, 1863. At the *post-mortem* examination, tubercular deposits were found in the lungs, and a large abscess in the left lung. The artificial joint was found to be provided with a complete capsular ligament, and the articulating surfaces were tipped with cartilage and furnished with synovial membrane. In consequence of Dr. Bauer, in his work on *Orthopædic Surgery* (p. 325), stating that this case of Dr. Sayre's died of pyæmia, a number of letters from medical men are given in the appendix to the paper, confirming the tubercular theory, and also Dr. Sayre's statement as to the existence of cartilaginous covering to the bone, synovial membrane, &c.

I am not aware of any operation having been performed in this or any other country on the hip-joint in cases of bony anchylosis, with the object of obtaining free motion by the establishment of a so-called "artificial joint;" and it will at once be seen that further experience is required before we can confidently speak of the success of such an operation, although the cases recorded by Dr. Sayre are undoubtedly worthy of the most attentive consideration.

It occurred to me, however, that in these cases of bony anchylosis of the hip-joint, with extreme distortion, a much more simple operation might be performed by the subcutaneous division of the neck of the thigh-bone, about its centre, within the capsular ligament, using for this purpose only a long tenotomy-knife, and a very small saw constructed for the purpose, with an inch and a half cutting edge, and a long thin shank like a tenotomy-knife; and, on the 1st December, 1869, I performed this operation successfully on the following case.

Luke Bristowe, aged 24, a gardener from London, near Chippenham, Wiltshire, was admitted into the Orthopædic Hospital, on the 12th October, 1869, in consequence of extreme deformity at the hip-joint. The thigh was flexed upon the pelvis at a right angle, and firmly anchylosed in this position; the heel of the right leg rested on the upper part of the left knee-joint, and the limb was therefore perfectly useless. The only mode of progression was either with two crutches, or with one crutch and a stick, which he generally used. He had also anchylosis of the vertebral articulations through a considerable portion of the spinal column; all the lumbar and lower dorsal vertebræ were perfectly immoveable, and the spine was curved posteriorly, with an inclination to the right side in the lower dorsal and upper lumbar region. In consequence of this anchylosis through the lumbar region, the pelvis and spine could only be moved together, and the trunk and leg therefore appeared to be remarkably fixed in the deformed position. There was also a fixed and permanent obliquity of the pelvis, with regard to the spinal column, to the extent of two inches, as ascertained by careful measurement. Partial anchylosis also existed in some of the upper cervical vertebræ; the motion between the occipital bone and the atlas was free, but between the atlas and the axis motion was extremely limited, and the head was habitually carried forwards. This affection was the result of an extremely severe attack of rheumatic fever, with which he was seized seven years ago June last, and which, he stated, was not preceded by gonorrhœa. Various articulations were affected during the fever, and the rheumatic pains were severe for six months, and continued more or less for twelve months. During the latter part of this time he was an inmate of the Bath Hospital for fifteen weeks, and had the hot mineral baths, but without any marked relief; and he then went into the Brighton Hospital for nine weeks, where he was galvanised, and had to swing a seven pound weight, but without material benefit. No treatment had been adopted during the last six years, nor had he suffered from any further attack of rheumatism. His general health was good, and also his family history.

That the case was one of true bony anchylosis, was proved by the failure of forcible extension under chloroform, tried on three separate occasions at the Orthopædic Hospital; and after this I suggested to the patient the operation of dividing through the bone as the only means of restoring the position of the limb, and he readily gave his assent. For the purpose of the operation, and that he might have the advantage of superior nursing, if required, he was removed to the Great Northern Hospital on the 26th November, 1869.

On the 1st December, 1869, I divided the neck of the thigh-bone subcutaneously within the capsular ligament, in the presence of my colleagues, Mr. Gay, Mr. Carr Jackson, and Mr. Shillitoe; Mr. Mason, Dr. H. Dick, and Mr. John Mackenzie of the Bombay Hospital, were also present. The instruments used were a long tenotomy-knife, and a very small saw, three-eighths of an inch in width, and with a cutting edge an inch and a half in length, at the end of a slender shank three inches in length, made by Mr. Blaise of St. James's Street. The details of the operation were as follows.

I entered the tenotomy-knife a little above the top of the great trochanter, and, carrying it straight down to the neck of the thigh-bone, divided the muscles and opened the capsular ligament freely. Withdrawing the knife, I carried the small saw along the track made—preserving this by pressure of the fingers—straight down to the bone, and sawed through it from before backwards: this was accomplished in five minutes. No hemorrhage followed; and I immediately applied a compress of dry lint, a plaster, and bandage.

As soon as the bone was cut through, the leg moved freely in all directions; but, before it could be brought into a straight position, it was necessary to divide the tendons of the long head of the rectus and of the adductor longus muscles, and to cut through the tensor vaginæ femoris muscle. The limb was fixed in a straight position and bandaged to a long interrupted Liston's splint. No inflammation, whatever followed the operation; no swelling or redness of the skin, or any deep suppuration; but the wound healed slowly. The House-Surgeon, Mr. Willis, reports as follows.

Dec. 4th. The long splint was changed to-day for a short one. He could move the leg from the hip gently whilst the splint was off. The tenotomy wounds were quite healed.

Dec. 5th. A four-pound weight was attached to the leg, which he bore well for a time.

Dec. 7th. The dressing was removed for the first time to-day. A few drops of pus only escaped from the superficial wound. There was no deep suppuration going on. The superficial wound was dressed with carbolic lotion, one part in forty.

Dec 18th. The splint was removed altogether to-day. He could draw the leg up almost as well as the sound one, and had very fair motion at the hip.

Dec. 22d. He was going on well. No feeble symptoms or deep suppuration were going on. The superficial wound was nearly healed. There never had been more than two or three drops of pus on the lint in the morning. Collodion and castor-oil were applied to-day instead of carbolic acid lotion. He got up to-day for the first time, just three weeks since the operation.

I encouraged motion from the 18th December, and moved the limb frequently myself; and, when he walked about the ward on crutches, induced the patient to swing the leg as much as possible. After walking about daily for a fortnight, however, the limb began to stiffen at the hip, and all attempts at movement were painful. I then determined to abandon all idea of obtaining motion, and endeavour to procure bony anchylosis with the limb in a straight position.

On the sixth January, 1870, the man was ordered to keep his bed, and the limb to be maintained in a straight position by an extending weight of from three to five pounds suspended over the end of the bed. At the end of three weeks, the divided neck of the femur seemed to be firmly anchylosed; and on the 24th January he was discharged and transferred to the Royal Orthopædic Hospital.

March 18th. He had gained sufficient strength to be able to walk about the ward with the aid of one stick, and he could walk a little without any assistance.

April 25th. He was taken to the Medical Society of London, and exhibited his power of walking about the room without any assistance. He continued steadily to improve, and gained sufficient strength to bear the entire weight of his body on the leg which had been operated upon. He still, however, generally used one stick in walking, and walks with the body somewhat inclined to the right side in consequence of the obliquity of the pelvis and anchylosis of the lumbar and lower dorsal vertebræ. Although there appears to be a little shortening of the right leg, he is not at all improved, as to the erect position of his body, by any addition to the boot, so that he wears boots of the same thickness.

Nov. *10th, 1870.* *This patient* having been at his home in the country

for several months, came to London, and I again examined him. He could now walk three or four miles with ease, and did not require a stick for walking purposes, although he always used one to improve the general balance of his body, which was somewhat disturbed by the spinal curvature.

In comparing the relative merits of the three operations which I have now described by rectifying extreme distortion at the hip-joint with bony anchylosis, the different objects sought to be accomplished and the risk to life incurred in each operation must be borne in mind. The operations performed by Barton and Sayre were undoubtedly of a formidable character, requiring large external incisions, and necessitating considerable disturbance of structures at a great depth from the surface to allow of the use either of an ordinary saw or of a chain-saw, as employed by Sayre; and the evidence is not yet sufficient to prove that even by such means a permanently useful artificial joint can be established in the neighbourhood of the hip-joint. In Rhea Barton's case, bony anchylosis was proved to have taken place by the *post mortem* examination of the patient, who died from phthisis eight years after the operation, although motion is said to have been preserved for six years.

In Sayre's first case, in which a segment of bone was removed above the small trochanter, an useful limb was permanently obtained, and good motion existed five months after the operation, but some necrosis subsequently occurred; and the late accounts, six years afterwards, are less satisfactory than we could desire as to the evidence of free motion at the joint. In Sayre's second case, which undoubtedly offers a good illustration of the establishment of a false joint, necrosis, although in a limited degree, was still preceding at the time of death—six months after the operation—and bone had exfoliated previously, so that Dr. Bauer was induced to believe that the death arose from pyæmia rather than phthisis.

In the case which I have now brought before the meeting, I was encouraged, by the absence of inflammation, to hope for the establishment of motion; but, this failing, the result was limited to remedying the deformity and obtaining a useful limb for the patient, with bony anchylosis in a normal position; and to such a result I would advise, in all future operations, that our expectations should be limited.

With regard to the subcutaneous operation, which, so far as I know, was first suggested and performed by myself, and which I have now brought before the British Medical Association, I would only observe that the subcutaneous division of bone—subcutaneous osteotomy, as it may be called—has proved itself to be as simple and harmless an operation in its immediate effects as subcutaneous tenotomy, with which, in its essential characters, the operation may be compared.

Since this paper was read at the Association meeting, this operation has been successfully performed by Mr. T. R. Jessop of Leeds, who on the 17th September, 1870, writes as follows. "Three weeks ago last Thursday, I performed the operation upon a young woman whose right thigh was fixed by bony anchylosis at a right angle with the pelvis. By practising upon the dead subject, I had previously found that the best spot at which to make the puncture was about an inch behind the posterior margin of the great trochanter, near its upper border. The division we made without any difficulty. The operation and the subsequent dressings were performed after Professor Lister's method. The wound healed at once without a single drop of pus. For a fortnight I kept the patient in bed, with the limb stretched by means of a weight slung over a pulley attached to the ankle. Since the expiration of a fortnight, I have had the woman up, walking about on crutches, and swinging the leg in all directions, with the view of procuring a false joint. The limb measures barely an inch shorter than the sound one; and the patient makes complaint only of a little pain in both hip and knee. *Crepitus can both* be felt and heard very distinctly. I will have the result *duly reported*." The operation has also been successfully performed by Mr.

F. W. Jowers, of Brighton, and Mr. Furneaux Jordan, of Birmingham. No inflammation or suppuration followed the operation in either case. The details of these three successful cases will shortly be published; and the fact that this operation has been successfully performed in four cases, goes far to establish it as a surgical procedure.—*British Med. Journal*, *Dec.* 24, 1870, *p.* 678.

38.—SUBCUTANEOUS SECTION OF THE NECK OF THE FEMUR.

By Furneaux Jordan, Esq., Surgeon to the Queen's Hospital, Birmingham.

Emma H., aged 16, from Wales, had had hip-disease for six years. She had had several sinuses opening and closing during that time. On admission into hospital, there was a little oozing from one near the perinæum. The thigh was flexed at right angles to the trunk; and there was unmistakable osseous anchylosis of the hip-joint, as revealed by examination under chloroform. I divided the neck of the femur by the method and with the instruments devised by Mr. W. Adams. The sudden mobility of the joint when the section of the femur was completed was very striking. The adductor longus and long head of the rectus femoris required tenotomy. The limb was then put into a position which promises a very useful result. It is now three weeks since the operation, and the progress has been most favourable.

In this case, the naturally short femoral neck of early life, made shorter by caries and anchylosis, combined with a very fat gluteal region (since anchylosis, the patient has become very stout), required more than ordinary care in every step of the operation.—*British Med. Journal*, *Dec.* 24, 1870, *p.* 676.

39.—A NEW METHOD OF UNITING FLAPS BY DEEP SUTURES.

Mr. Couper, of the London Hospital, who has for some time past practised Professor Lister's system of antiseptic treatment of wounds with very good results, has, quite recently, combined with it the following means of securing apposition of the deep portions of flaps. A curved needle, into which is threaded a large carbolised gut ligature, is introduced into the flap, close to its edge, and a short distance from its base; the needle is passed in a semicircular course, transversely to the axis of the limb, immediately beneath the skin, until it emerges at a corresponding point on the opposite side of the flap; the thread is then drawn through to within two or three inches of its end. The needle is next introduced into the other flap, at a point opposite to where it emerged from the first—the point which, as far as can be judged, will correspond to it when the two surfaces are brought into contact,—and is made to travel in a similar transverse semicircular direction, so that in the end it emerges in the one flap at a point opposite and corresponding to the one where it was first introduced into the other, having completed a circular course beneath the skin of the two flaps. The ends of the suture are drawn until the flaps are brought into accurate contact (much as the mouth of a bag is closed by drawing the ends of a circular string), and knotted and cut off short. If the flaps are long, another suture is passed parallel to the first, a little further from their bases; and when the skin edges have been secured with another suture, the one or more circular ones, knot and all, are completely included and shut out of sight. Before the external suture is quite secured, a syringe is insinuated between the flaps at the spot which remains open, and a jet of carbolised fluid is injected to ascertain whether there remains sufficient egress for any fluid that may be poured out from the wounded surfaces. In the first cases Mr. Couper employed for the external suture a fine gut thread, which he tied interruptedly, so as to have an abundant opening for discharges; but, as he found it to give way before sufficient union had taken place, he has resorted to the use *of metal* sutures; and, as the precaution he employed for

the free discharge of matter proved to be unnecessary, he has used iron wire in his later cases, and applied it in a very close uninterrupted stitch, which is made to include the skin only.

A few days since we saw a case in which Mr. Hutchinson had amputated the forearm at about the middle, and in which Mr. Couper had, at the operator's request, undertaken to bring the flaps together in the manner above described, with all the precautions of Lister's system of dressing. It was the ninth day since the operation; the situation of the union of the flaps was indicated by a thin line of dried sanguineous matter, altered in colour by the carbolic dressing, beneath which lay the finely stitched continuous suture, which, as nothing but the extreme edge of the skin had been included, would, in the course of two or three days more, cut its own way through, and separate itself without external aid. We ascertained that, with the exception of a very slight serous oozing during the first twenty-four hours, no discharge whatever had been thrown out; nor has there been in any of Mr. Couper's later cases which have been similarly treated. In some cases he finds it useful to employ in addition one or two gut sutures, inserted by transfixion of the flaps, and tied externally. These wither in the course of two or three days, at the point where they enter the skin; and when brushed away leave a small red cicatrix of about the same diameter as the suture employed.—*Lancet*, *Dec.* 24, 1870, *p.* 886.

40.—TRIPOD APPARATUS FOR THE REDUCTION OF DISLOCATIONS OF THE HIP.

The following is abstracted from a monograph on the hip-joint by Dr. Bigelow of Massachusetts, U. S. The patient is to be laid on his back on the ground and the pelvis is to be buckled to the floor; and the limb, flexed at the knee and hip, is suspended by cord and pulleys from the leathern cap which fits on the summit of a tripod. A transverse rod passes across the front of the knee through rings in the pair of angular splints. The projecting ends of this rod afford the means of effecting powerful rotation of the femur; and a similar rod, placed behind the leg and in its axis, supplies the means of producing "another useful movement, called by the French *bascule* or tilt." By vertically raising this rod at its upper extremity, Dr. Bigelow holds that the head of the bone may be carried from the dorsum or pubes in the direction of the tuberosity: "Although the need of this apparatus may be rare, it will prove occasionally efficient in reducing a luxation of long standing or complicated with fracture. At any rate, I cannot believe that the period is remote when longitudinal extension by pulleys to reduce a recent hip-luxation will be unheard of." We fully agree with the author as to the importance of the flexed position, and would suggest that the tripod part of his apparatus might easily be dispensed with in cases in which the roof of the room, or a doorway, affords a convenient beam for the reception of a strong hook. The rest might also be extemporised by any one who understood its principles.—*British Med. Journal*, *Jan.* 14, 1871, *p.* 38.

41.—ON A CASE ILLUSTRATING THE PRESENT ASPECT OF THE ANTISEPTIC SYSTEM OF TREATMENT IN SURGERY.

By Joseph Lister, Esq., F.R.S., Professor of Clinical Surgery in the University of Edinburgh.

A young man, eighteen years of age, was lately admitted under my care in the Royal Infirmary on account of impaired usefulness of the right arm, resulting from an accident which befell him three months previously, when the handle of a winch, revolving with great rapidity, struck the limb at the *posterior* aspect, about three inches below the elbow, breaking the ulna and *dislocating* the upper end of the radius forwards, the lower ends of the

bones of the fore-arm being tilted backwards to a corresponding degree. He at once sought medical aid; but, strange to say, the nature of the injury was not recognised, and the result was that when I saw him the fragments of the ulna were firmly united at an obtuse angle with each other; a marked depression existing posteriorly over the seat of fracture, while the head of the radius formed a prominence at the anterior and outer aspect of the joint, being securely maintained in its abnormal position through the connection of the other end of the bone with the lower end of the ulna. The elbow could not be flexed beyond a right angle, so that he could not put his fingers to his mouth; and, although the hand could be rotated passively, he was quite unable himself to execute pronation or supination. He also complained that the limb was so weak that he could not lift any heavy object from the ground, and expressed great desire to have this faulty state of matters rectified.

It was plain that before an attempt at reduction of this dislocated radius could be made with any chance of success, it would be necessary to break again the united ulna. But, considering the length of time that had passed since the accident, and the slightness of the leverage that could be obtained upon the seat of fracture so near the elbow, it seemed hardly likely that this object could be attained without a cutting operation. And even supposing the bone to give way, I felt it very doubtful whether the dislocation could even then be reduced, both on account of its long duration and because the angular form which the ulna had assumed implied a shortening of the fore-arm, which at that late period necessarily affected all its textures. On the other hand, there could be little doubt that, if the ulna were exposed and divided, and if, further, the head of the radius were removed, the limb could be at once restored to its proper form. But to do this would be to make voluntarily a compound fracture of the ulna and a compound dislocation of the elbow-joint—a procedure which, under ordinary treatment, I should have regarded as unjustifiable. But with the means now at our disposal of guarding against the mischievous influence of external agents upon wounds, I believed that these two operations could be performed without any chance of mischief resulting. Accordingly, at a clinical lecture on the 12th December, having explained the aspect of the case, and having failed to break the ulna by very forcible measures under chloroform, I first washed the skin of the fore-arm and elbow with 1 to 20 watery solution of carbolic acid, to destroy all the putrefactive particles in the epidermis and hair-follicles, and then made a longitudinal incision about two inches long over the back of the ulna where it had been broken, while an assistant threw over the part a cloud of spray of 1 to 40 carbolic lotion by means of Richardson's apparatus; and, having sufficiently detached with the knife the muscles from the bone, and ascertaining precisely with the finger the situation of the callus, I inserted the blades of a pair of strong bone-pliers, smeared with an oily solution of the acid (1 to 10), and, cutting through the bone, used the pliers as a powerful lever to wrench the fragments sufficiently apart, and detach them enough from surrounding soft parts to insure free mobility, the antiseptic spray being meanwhile constantly maintained. A sponge wrung out of 1 to 40 watery solution having then been bandaged upon the wound, I made an attempt to reduce the dislocation of the radius; but, meeting with the failure I had anticipated, I at once cut down upon its head in a cloud of spray, and removed it by nipping through its neck with the pliers, the blades of which had been again smeared with the oil. A folded cloth dipped in the watery solution having been laid upon the wound, I had the satisfaction of finding the fore-arm to assume, under moderate extension and coaptation, a perfectly normal shape. The limb was then enveloped in lac-plaster from the middle of the arm to the lower part of the fore-arm, the sponge and cloth having been previously removed under the spray, the wounds being left unstitched, to secure complete absence of tension from accumulating blood or serum. Cloths to absorb discharge, and a roller smoothly applied so as to adapt the plaster well to the limb, and a pair of Gooch's splints, anterior and posterior, with a special pad in front over the seat of fracture, completed *the dressing, the elbow* being kept at a right angle.

Next day, the dressings were entirely changed, when it was found that a good deal of blood and serum had oozed into the cloths. The lac-plaster was cut up with scissors along a line distant from the wounds; and, as it was raised from the limb, the spray of 1 to 40 lotion was made to play beneath it. The gaping wounds were found filled with blood-clot, while the limb was free from swelling, redness, or tenderness. The limb having been washed from bloody stain with a cloth dipped in 1 to 40 lotion, while the wounds were kept covered with bits of rag wrung out of the same, oiled silk "protective," dipped in the lotion to give it a temporary antiseptic film, was placed upon each wound to protect it from the stimulating action of the acid in the lac-plaster, which was then wrapped round the limb in two layers, extending several inches beyond the "protective" in every direction, after which the splints were reapplied as before.

This dressing was left unchanged for two days, after which the patient was again dressed in a precisely similar manner before the clinical class, walking into the theatre and up stairs again to his bed just like a person affected with a simple fracture or dislocation. His pulse was 70, his temperature 98·2, and he was entirely free from pain. The stain on the cloths corresponded to about half a drachm of bloody serum; the clots remained unaltered in appearance in the wounds, and the limb in the vicinity had still a perfectly natural aspect. Feeling sure that the discharge would now be very slight in amount, I left this dressing untouched till the following lecture, four days later, or just one week after the operation, when the wounds were again exposed before the class. All remained the same, except that while there was no pus, and merely a stain corresponding to a few minims of serum as the product of both wounds for four days, the blood-clots had been extensively converted into vascular tissue, while some portions yet unvascularised had assumed a grey or yellowish colour, and in both wounds there was a broad cicatrising margin. Healing, though under a moist dressing, was going on as under a scab; or, in other words, putrefaction being excluded by means of an efficient antiseptic guard, while the exposed tissues were protected from the action of the antiseptic salt by the interposition of a layer of unstimulating material, the disturbing influence of external agency was avoided, and we attained very closely to the conditions of a subcutaneous injury,

On this occasion, instead of the lac-plaster, a folded muslin cloth, of open texture, imbued with a mixture of paraffin, resin, and carbolic acid, was employed to combine the functions of the lac-plaster and absorbing cloth. Hitherto I have been opposed to porous antiseptic dressings, having observed that, when in the form of lint steeped in an oily solution of carbolic acid, the discharge, if at all free, washed out the antiseptic liquid from among the neutral fibres, and opened a way for the penetration of putrefaction. But, having heard reports from various quarters of the efficacy of oakum, I have lately put it to the test with granulating sores, where, if it should happen to fail, no mischief would result, and I have found it more than answer my expectations. The reason for its superiority over oily cloths is readily intelligible. Each fibre of the oakum is imbued with an insoluble vehicle of the antiseptic; so that the discharge in passing among the fibres cannot wash out the agent any more than it can when flowing beneath the lac-plaster, to a narrow strip of which an individual oakum fibre is fairly comparable. I may remark as worthy of notice by those who still cling to the idea that carbolic acid has some unknown virtue distinct from its antiseptic property, that oakum contains none of that substance, but creosote and probably other antiseptic hydro-carbons, the effects of which in preserving smoked meat are familiar.

Oakum not only proved efficient antiseptically, but presented several advantages over lac-plaster. When the latter is left as a dressing for several days together, the discharge, even though small in amount, soaking into the absorbing cloths, loses the carbolic acid it had received from the plaster, and putrefying from day to day, assumes an acrid character, and sometimes *produces* most troublesome irritation of the skin. This is, of course,

avoided by the oakum. Again, the lac-plaster being quite impermeable to watery fluid, keeps the skin beneath it moist, and, in fact, covered with a weak watery solution of carbolic acid, which, I suspect, insinuates itself, more or less, beneath the protective, and maintains a slight stimulating influence upon the parts beneath it. But oakum, draining away the discharge as fast as it is effused, avoids this source of disturbance. The result is, that if a granulating sore is thoroughly washed with an antiseptic lotion and covered with "protective" and a well-overlapping mass of oakum secured with a bandage, a dressing is provided which nearly approaches the ideal I have long had in view. For, as granulations do not form pus or even exude serum except when stimulated, a persistent antiseptic, combined with an efficient protective, should constitute a more or less permanent dressing under which discharge should cease and cicatrisation proceed with great rapidity. Accordingly, ulcers of the leg treated in this way have been found, when exposed after the lapse of several days, either entirely healed or greatly advanced in the process, while the moisture beneath the protective has been of a serous character and the discharge collected in the oakum comparatively small in amount. Lastly, the lac-plaster has this further disadvantage from the moisture beneath it, that it prevents efficient strapping in cases that require it. But under oakum an adhesive plaster retains its hold as well as under dry lint.

But while oakum has these great advantages, it is disagreeable to many persons from its strong tarry smell; and I have been lately endeavouring to apply the oakum principle in some shape free from this objection. Oakum consists of the detached fibres of old ropes which had been treated with Stockholm tar, among the constituents of which is common resin. I happened to notice, several years ago, that resin holds carbolic acid with remarkable tenacity, so that if one part of the latter be mixed by melting with five of the former, the glutinous mixture which results on cooling communicates only a slight warm taste to the tongue, though containing so large a proportion of the pungent antiseptic. But this material is of itself too sticky for the purpose, and resin is, besides, somewhat irritating to delicate skins. Paraffin, another constituent of tar, is remarkable for its entire absence of adhesiveness, as well as for its perfect blandness; but when pure, though it may be mingled with carbolic acid in the melted state, it separates entirely on cooling. If, however, the three ingredients be melted together, the resin, though intimately blending with the paraffin, still retains its hold upon the acid after cooling, and by a proper proportion between them, a product is obtained which, while intermediate in physical properties between the glutinous resin and the powdery paraffin, is unirritating to the most sensitive skin and highly retentive of the acid, while almost destitute of odour.

Cheap muslin gauze dipped in the melted mass, and well wrung or pressed while hot, is an elegant and convenient form of modified oakum. It should be folded into about eight layers; and in order to prevent the discharge from soaking too directly through it, a piece of thin gutta percha tissue may be placed beneath the outer layer to guide the fluid towards the edge of the cloth.

Such was the dressing employed a week after the operation. Three days later, the wounds were found still healing rapidly without suppuration, and, on rotation of the hand, the end of the radius was felt moving in its proper place, while the ulna presented a slight convexity backwards instead of its old concavity. The patient, who had been till then confined for the most part to bed, as a matter of precaution, was now allowed to get up, a similar dressing of "protective" covered with antiseptic gauze having been applied.

Four days afterwards, on the 26th instant, the dressing was again changed, when the wound over the ulna was found almost healed, and that over the joint far advanced in cicatrisation, while there was still no pus or putrefactive odour, and the general health of the patient continued excellent.

In some respects it would have been more satisfactory if sufficient time had passed to permit reunion of the ulna, so that the usefulness of the limb might be tested. But as an illustration of antiseptic treatment, the case is already complete. In this respect, I cannot but hope that it will be thought instructive. It is an example of a procedure, otherwise highly dangerous, if not unwarrantable, rendered not only legitimate, but entirely free from risk, simply because, from the circumstances of the case, and the improved means at our disposal, we could calculate with certainty on avoidance of putrefaction. I venture to draw special attention to the use of the spray. In every wound treated antiseptically, two things are always to be attended to: first, to leave the wound free from living putrefactive organisms, and, second, to employ such an external dressing as shall securely prevent the entrance of such organisms at any subsequent period of the case. The latter point has, in most cases, been for a long time past satisfactorily accomplished; but the former, till we used the spray, was always a matter of more or less uncertainty. A floating germ might enter during the operation into some cellular interstice among the tissues, and, becoming surrounded with a clot of blood, might escape the action of the antiseptic lotion with which the wound was washed, and, retaining its vitality, might subsequently propagate its kind, and spread putrefactive fermentation through the wound. But by help of the spray we operate in an antiseptic atmosphere, and effectually prevent putrefactive organisms from ever entering the wound alive. We thus dispense with the necessity for washing the wound at all with an antiseptic lotion, and in the particular case above related, not even the vapour of carbolic acid penetrated into the deeper parts of the wound, which were thus left as free from irritation as if they had been made subcutaneously.

The spray is also of the greatest value during the stitching of such wounds as require it, and rids us of the troublesome and uncertain process of distending the wound with lotion by means of a syringe, after the introduction of the last suture. In the changing of dressings, also, the spray is in some cases, and especially in stumps after amputation, a great element of security.

Revision of the proof (Jan. 11, 1871) affords me the opportunity of giving another report of the progress of the case. On dressing the limb yesterday, after an interval of five days, I found the ulnar wound entirely healed, while at the site of the radial incision two or three granulations about as large as pins' heads alone remained to cicatrize, and an odourless serous stain of about a minim upon the gauze was the only appearance of discharge. The ulna seemed already firmly united; and, after performing passive motion throughout the range of the natural movements of the joint, I directed him to try its powers. He could himself pronate and supinate the hand, could extend the arm completely, and readily put his fingers to his mouth; and he lifted a heavy pair of tongs, exhibiting already a strength very superior to that which he had before the operation.—*British Med. Journal, Jan.* 14, 1871, *p.* 30.

42.—ON THE APPLICATION OF CARBOLIC ACID AS A LOCAL ANÆSTHETIC IN SURGICAL OPERATIONS.

By Dr. J. H. Bill, Surgeon U. S. Army.

In conducting some investigations on the action, &c., of carbolic acid, the writer has made the following observations, which, as they seem to be of practical importance, he communicates in advance of the other results:—

All who have handled this substance must have noticed the tingling sensation (not unlike that produced by aconite) in the finger tips and other parts touched by the acid, which presently passes into a greater or less anæsthesia. On trying to determine the amount of this anæsthesia with an *ordinary* æsthesiometer it was found not only impossible to distinguish two *points, however* widely separated, but even to recognise the presence of one.

The prick of the point was not felt at all as pain, nor was an incision productive of uneasiness. The experiment was, therefore, extended thus:—The radial side of the writer's left forearm was covered with a cloth soaked in a saturated solution for a half hour, then a streak was traced over the course of the radial artery with a camel's hair brush dipped in acid liquefied by one-twentieth bulk of water. This streak extended from the styloid process to near the elbow, and after a few minutes was rubbed off. An incision was then made with a common scalpel from a point about two inches above the styloid process towards the internal condyle for five inches, occupying as near as possible the middle of the streak made with the brush, and extending down to the fasciæ investing the flexor muscles (superficial) of the thumb and fingers, so that at its lower extremity the radial artery was exposed and could have been ligated. This incision was unattended with pain, save where nerves distributed to or passing over the muscular fasciæ were pricked or divided, and even in this case the pain was not at all unbearable. *The incision of the integument was painless*, and the writer would have been unconscious of the injury save from the sensation communicated to his hand holding the knife as it was drawn through the tissues. This observation or experiment was made nearly a year ago. It was applied practically at once to all minor cutting operations. The writer has not incised a felon or bubo since without successfully employing this method for preventing or greatly mitigating pain. Many cases could be given, one will suffice. David Harris, of Vancouver, applied with his second finger of the left hand highly inflamed from a felon, the parts much injured by burrowing of pus. A previous felon had been treated on another finger a few months before, and the requisite incision had given him exquisite pain; the patient therefore apprehended great suffering from any operation on the finger now diseased, and begged for chloroform. However, the finger was soaked for fifteen minutes in warm water containing three per cent. of carbolic acid, dried, and then a brush dipped in the concentrated acid, drawn over the finger in the course of the intended incision. These, two in number, were then made, using a thin edged scalpel by a slow sawing motion, allowing only the weight of the knife to make the cut. The patient stated that he had suffered no pain, or not more than would have resulted from handling the parts. The parts healed at once. Sometimes it is necessary after making an incision nearly through the integument, if sensibility becomes apparent, to brush out the wound made with some liquefied acid before extending the incision deeper. This was necessary in a palmar abscess treated by this method without pain. The writer has excised a small tumour partly by this plan. Buboes have been operated on painlessly, and in short, the writer can recommend the plan in any cutting operation where no dissection of the skin is involved, and where all the pain results from the cutting of the skin. It is hoped that it will be of special service to those who are compelled to operate without an assistant. The writer was thus compelled this summer to remove from his right hand, by an incision of over two inches in length, a large wooden splinter which had been thrust through the palmar fascia, and had lodged under the tendon of the lumbricalis of the index finger. It was done without pain, save where a nerve was divided. The incision healed without a scar.

These facts, which the writer believes he is the first to point out, have theoretical relations of great interest which may be discussed in a future paper.—*American Jour. of Med. Sciences, Oct.* 1870, *p.* 573.

43.—THE EXHAUSTING NEEDLE-TROCAR; A MEANS FOR THE DIAGNOSIS AND TREATMENT OF TUMORS AND EFFUSIONS.

By Dr. Prothebor Smith, Physician to the Hospital for Women, &c.

[As we can ourselves testify to the value of Dr. Smith's invention, we give with pleasure the following article on the subject.]

Fine exploring trocars have been long in use, but, from their inability to evacuate viscid fluids, they have failed to accomplish the end intended, and, from their size, to be employed with impunity for puncturing deep structures. To attain these desired objects, I adapted needle-trocars to an exhausting air-pump or glass syringe. The instrument can now be used without danger or difficulty, wherever acupuncture can be employed, for the purpose of diagnosing, evacuating, and treating tumours and effusions of all kinds, whether of joints or cysts containing viscid fluid or otherwise, whether declared by fluctuation or only by the history of the case pointing to this probable issue ; in abscess or in abnormal effusion in any of the serous cavities, and in extreme cases of retention of urine, without injury to the bladder. It is also equally efficacious in disengaging excessive collections of flatus, which often prove so distressing in tempanitic distensions of the intestines as to defy all other modes of relief. In the same way, without removing the instrument, remedies can be injected into cysts, abscesses, &c., without any risk of the admission of air. Only a few days since I operated at the Hospital for Women on two cases of ovarian cysts containing respectively ten pints and ten pints and three ounces of viscid fluid ; also on a case of ascites, from which I withdrew sixteen pints and a half in less than half-an-hour, with complete relief, yet with no more pain than that of the prick of a pin, and leaving only the mark of the needle on the skin, and therefore requiring no after-treatment.

Three years and a half ago, Messrs. Mayer and Meltzer made me a set of these exploring needle-trocars, with exhausting glass-syringe attached, which I exhibited in August, 1867, at the annual meeting of the British Medical Association in Dublin ; at Oxford in 1868 ; and at Leeds in 1869 ; I also showed them to several eminent physicians in Paris in 1868, as well as to M. Robert, the instrument-maker, and successor to M. Charrière.

The instrument consists of very fine hollow steel needles gilt, adjusted to a powerful exhausting glass air-syringe ; or, as it has since been called in Paris, *aspirateur sous-cutané*, or "pneumatic aspirator." The syringe, by means of a double-action tap at its distal end, and a spring stop on the piston-rod, forms an air-pump, and in action becomes an exhausted receiver, which enables the operator easily to withdraw or inject fluids. Finding, however, in cases when large quantities of fluid, as in ovarian cysts, psoas, abscesses, &c., have to be evacuated, that there was some difficulty in manipulation and great labor in pumping, I suggested the important alterations which I now have the honor to exhibit. This, in place of the exhausting syringe, supplies a glass cylinder of one, two or three quarts, or more, exhausted by a powerful air-pump, which, by a contrivance in its piston, has a double action of either expiration or inspiration, by which it readily imbibes or expels the evacuated fluid. By means of a long flexible gum-tube attached to the receiver, and terminating, to the extent of three inches, in glass tubing, the cylinder is connected with the exploring needle. This can now be used with perfect ease and at some distance from the receiver. There being stopcocks at each end of the glass-tube and trocar, as well as at the other end of the elastic tube, the nature of the fluid imbibed is at once detected by the glass portion, which also enables the operator to see the colour and character of the fluid as it rushes past to fill the cylinder. In like manner a small as well as a large quantity of fluid can be easily and rapidly evacuated, without distress to the patient or fatigue to the operator.

In conclusion, I have only to notice the extreme delicacy of the needle-trocars—some almost like bristles—to show the necessity of great caution in their use. They should be introduced—as the needles in acupuncture—by rotating them between the thumb and finger, and holding them as near as possible to their point.

Since reading the above paper at Newcastle, I have found that the large *receiver* with double-action cylinder, which I there exhibited, though useful *in hospital* practice, was too cumbersome for general use. I have therefore

substituted a double-action glass-syringe, which, by the ordinary process of pumping, affords an all-sufficient power, alternately of suction and of expulsion, by which means any amount of fluid may be readily withdrawn. It consists of the exhausting syringe before described ; but, in place of a double action tap at its distal extremity, there are two valves placed one on each side. By one of these, when the piston is drawn out, the fluid is imbibed ; and by the other, when the piston is depressed, it is as effectually expelled. On the inspiration or suction-valve is a tap, which, when turned off, converts the cylinder into an exhausted receiver as required for the purposes of exploration and diagnosis. When, however, it is necessary only to evacuate fluid deposits and formations, the contents of a distended bladder, or the flatus of tympanitis, it is sufficient to use only the syringe as an ordinary pump. Further, to facilitate its use in withdrawing large quantities of fluid, a pedestal of thick wire, with stirrup-base for the foot, is supplied, which can be easily attached to the syringe, so that, by its help, the operator can steadily hold and work the instrument, when necessary, without the aid of an assistant.

The extreme simplicity of management and portable size of this instrument, as well as the ease with which it may be used in exploration for diagnosis or for the evacuation and injection of fluids, give it a claim to superiority of design and construction which heretofore has never been attained.—*British Medical Journal, Nov.* 26, 1870, *p.* 579.

44.—IN-GROWTH OF THE TOE-NAIL.

By Dr. J. Waring-Curran.

The general treatment of ingrowing toe-nail, which is always tedious and frequently troublesome, it is not my intention to review, but as briefly as possible to explain a form of treatment which I have practised for the last three years with uniform success, or, to be accurate, with that amount of success which may be expected resulting where evulsion of the toe-nail is not resorted to, and where, I think, I shall presently show the necessity of performing that simple, though painful, and disagreeable operation, was in several instances overcome. The first four of my patients were cases wherein I had exhausted my experience and book-learning, in order to prevent, if possible, evulsion; but there was little improvement; the cases did not progress as would have been desired; accordingly, I took advantage of a fortunate incident in trying a new method of treatment. At the house of a literary friend, I met an Italian lady, whose high attainments and publications are well known in literary circles. After discussing various topics, in conversation we entered upon the very remarkable one of "filbert nails," which she told us were cultivated by the ladies of her native town to such a degree that they ignored the wearing of gloves, in order to exhibit the neatness and symmetry of the finger nails. She told me, in order that they may be properly grown, chiropodists, practising the art of nail cultivation, were in the habit of putting their consultees under the following plan of treatment. Out of the centre of the nail they cut a triangular portion—the base at the free extremity of the nail, and the apex at the matrix—so as to encourage the nail to contract from the edges towards the centre; or, in other words, to make the central part of nail grow with greatest prominence. Having three chronic cases of in-growing toe-nails in the district, I bethought me to try the plan of cutting out a triangular central portion, with a very wide base, shaving the edges of the in-growth as thin as expedient with a piece of glass, and tying the separated nail together loosely with a piece of dentist's silk from beneath, and placing between the nail and contiguous soft parts, into which the nail intruded, a piece of thick worsted, coated with mercurial ointment. Where those exquisitively-sensitive granulations existed, I applied some extract of belladonna and resin ointment rubbed together, and adopted the same method in remedying the shape and growth of *the nail.*

In the course of time the affected nail assumed a better shape, grew out more prominently, and away from the sides, whilst the pain and irritation was overcome by the belladonna application, and eventually cured by the mercurial ointment, and pressure taken off by the better shape assumed by the nail.

As against every method of treatment, which has for its object the cure of in-growing toe-nail without evulsion, it may be said, my plan needs much patience, and requires time and perseverance. The patients were only too glad to have something to do, and to practice it, for there is a great antipathy among them to tearing out the nail by the forceps, even under chloroform. I ignore the ether spray, for I have used it in removing a toe-nail, and should be sorry to depend on its pain-destroying virtues in future.

Nails, thus operated on, acquired a normal shape in six months; whilst in from six weeks to three months, according to the existing severity of mischief in the soft parts surrounding the nail, the toe became healthy. I insisted on the wearing of broad-toed shoes with low heels, that the foot should not be thrown too prominently forward, or the toes be unduly compressed together.

In two of my patients the outer side of the toe-nail had overhanging soft parts which appeared healthy on the surface, but into which the nail was growing; these I shaved off with a bistoury, lifted the nail, took out the triangular portion, and, by stimulating applications, got a flat, healthy surface, which soon skinned over.

It may be readily gathered what I mean to show is that a central portion cut out of the nail will alter the shape of that nail, and, if the disease in the soft parts be attended to, will be found of great practical utility in treating, and altering the shape of, an in-growth of the toe-nail—*Medical Press and Circular, Nov.* 30, 1870, *p.* 434.

45.—ON THE USE OF GLUE BANDAGE.

By Dr. G. H. B. Macleod, Professor of Surgery in the University of Glasgow.

I have during the last few months given a more extended trial to the glue bandage, in the form in which the euphonious French have termed the "*bandage gelatino-alcoolisé lacé*," and have had every reason to be pleased with it. It is made by impregnating a roller with a solution of French glue in methylated spirit. When applied a sufficient number of times to the limb to make it firm, it is cut up the front, and finally laced through eyelets put into the cut edges. It is very light and elastic, and can be made of any degree of strength by the number of layers of bandage used. I obtained a tidier and neater, as well as a firmer mould, by putting adhesive plaster within and without the glued portion, a thin layer of cotton wool being next the leg. It is an admirable contrivance for giving support after the removal of splints.

In treating simple fracture of the leg in children, I have attained the best possible results from employing adhesive plaster, applied in a succession of stripes from the foot upwards (after adjustment, of course), and then two light pasteboard splints, retained at their upper and lower ends by a narrow circular band of plaster. The apparatus is of the simplest description, rapidly applied, cleanly, and permanent.—*Glasgow Medical Journal, Nov.* 1870, *p.* 4.

ORGANS OF CIRCULATION.

46.—TORSION OF ARTERIES AFTER AMPUTATION OF THE LEG.

(Report from cases under the care of Mr. Cooper Forster at Guy's Hospital.)

Mr. Cooper Forster has now twisted every vessel, large or small, in all his amputations for four years past, having been previously as much wedded to

acupressure for a considerable period. The result of his experience is remarkable, for we learn that he has not had a single case of secondary hemorrhage during the whole of this period. And the list of vessels twisted includes many arteries of the first size, for he has amputated through the thigh nine times in the last six months, and there are four of his patients with twisted femorals in the wards at this time. We were, therefore, very pleased to have an opportunity of observing closely his *modus operandi* in an amputation of the leg lately. On Tuesday, February 28, a middle-aged man was brought into the theatre with a deformed, useless leg, which it was proposed to remove. The man was a very stout, big fellow, and his left leg, from old disease, was atrophied, the knee flexed and displaced, and the dorsum of the foot occupied by a large gangrenous and exceedingly offensive ulcer. This ulcer had been before healed, but now resisted all treatment, and the man, worn by the distress and inconvenience of the disease, gladly acceded to Mr. Forster's suggestion that he should lose his leg. The only question was whether the limb should be severed above or below the knee, and this point Mr. Forster decided in favour of the minor operation, on discovering, whilst the man was under chloroform, that there was a fair amount of movement in the joint. The operation was performed by two equal flaps, and, the bone being sawn through, the vessels were twisted one after another. The forceps employed were such as are familiar to our readers as torsion-forceps, but the blades were broader and stronger than those we have usually seen, and terminated in broad, well-rounded points. Each vessel was seized and rapidly twisted some six or seven times, the wrist turning with the demi-circuit some twelve or thirteen times, until, in fact, the operator felt something "give;" and the safe completion of the torsion was tested by seeing the twisted bit of tissue pulsating away in the face of the flap. This point is specially insisted on by Mr. Forster. It happened that in this case torsion was particularly difficult. The deformity of the limb made it not easy for the Surgeon to see the wound well, and the larger vessels, as so often happens in leg amputations, retracted considerably, and were caught with much trouble. It was just such a case as has caused many an operator to throw aside the forceps and call for the threads; but Mr. Forster, with more confidence in the method, persevered time after time, until the refractory vessels were secured, and the flaps might be safely sewn up. The impression made upon us by the operation, which, we were assured, presented very unusual difficulties in the application of torsion, was that with such experience as Mr. Forster's before us (and his is not exceptional, for we believe that Mr. Bryant has had equally favourable results in the same Hospital), and with the manifest advantage of having no threads remaining in the wound—although we confess to being slow to credit the ligature with the many evils attributed to it of late—Surgeons generally would do well to give torsion a genuine trial. We know that it is employed now in many Hospitals, but we believe that if operators saw more of its use they would be glad to adopt so simple and effective a substitute for a process which requires an extra assistant, and is certainly attended by some few evils from which torsion is apparently free.—*Med. Times and Gazette, March* 11, 1871, *p.* 275.

47.—HÆMOSTATIC COTTON-WOOL.

Dr. Ehrle describes (*Berliner Klinisch. Wochenschr.*, No. 57, 1870) a hæmostatic cotton wool. The cotton is soaked for an hour in a solution containing 4 per cent. of soda, then washed and dried. It is then dipped one, two, or three times in a dilute solution of perchloride of iron, dried, and pulled apart by the fingers. It is hygroscopic, and is said to be an excellent dressing for wounds.—*Brit. Med. Jour., Jan.* 14, 1871, *p.* 39.

ALIMENTARY CANAL.

48.—ON THE RADICAL CURE OF HERNIA.

By Dr. A. Vans Best, Late Surgeon, Bengal Army.

Up to the present time, so far as I am aware, seven operations have been suggested for the radical cure of reducible inguinal hernia, all having the same object—the obliteration by plastic material of the aperture of exit.

The very simple operation (even more simple than that of Mr. Redfern Davies) I now recommend requires neither the invagination of the parts nor the use of plugs or buttons, whether of india-rubber or split shot. The steps of the operation are these:—

I use a rather long-handled flat nævus or hemorrhoid needle, well bent (quite a semicircle from shoulder to tip of 1¼ in. diameter), not too wide, and sharpened on both sides from one-third of an inch from the point. A fine hole is drilled for the passage of the ligature, a quarter of an inch from the point. This needle, with a plain dissecting forceps and strong salmon-gut, is all that is required for the operation.

In the first place, chloroform must be fully administered, the hernia reduced, and the thigh adducted and flexed. The finger, as usual, is introduced *quite within the internal ring*, carrying the integument in front of it up the canal, while the assistant draws the skin of the abdomen firmly over towards the opposite groin. The threaded needle is then passed close to the finger, a small piece of wax having been moulded on its point (instead of a canula); the handle of the needle is raised, and the point pushed through the internal pillar and the abdominal parietes close within the internal ring. The portion of gut on the convex side of the needle is seized by the forceps of the assistant, and the needle, still threaded, withdrawn through all the structures except the temporarily invaginated skin. The finger being carefully maintained *in situ*, the gut on the concave surface of the needle slightly pulled by the assistant, while that already seized is firmly held; this facilitates the turning of the needle and transfixion of the outer pillar (Poupart's ligament). This being accomplished, the skin of the abdomen is drawn towards the crest of the ilium, and the needle passed through the original aperture, unthreaded, and the finger and it withdrawn. We have, therefore, one scrotal and one abdominal aperture—the latter directly above the aperture of exit of the hernia. Nothing now remains but to tie firmly home the two ends of the salmon-gut, cut it short, and let it drop into the wound. A pad and spica bandage are applied, a dose of opium is given, and the patient kept in bed until the parts are well matted together. The knot of salmon-gut will either become encysted or come away, it matters little which; in either case the approximation of the pillars is certain. It is satisfactory to the operator that the assistant should pass his finger up to the internal ring, when he can distinctly feel it grasped as the ligature is tightened. It is absolutely necessary that the salmon-gut should be soaked in warm water for five minutes before being used, and that long round threads should be selected. The needle should be threaded from the concave side.

I have at present performed this operation only three times—twice with complete success. The unsuccessful case occurred in the European General Hospital, in Calcutta, where the patient, a sailor, leaped over several beds within a week after the operation, and reproduced the hernia.

I would suggest that this operation should be employed when a very large ring exists, so that its space might be diminished, and that the protrusion might thus be brought under command of an ordinary truss.

In the three cases on which I have operated I have had no hemorrhage. One was to all appearance a direct, the others examples of external, inguinal hernia. I give a short summary of my last case.

In consultation with Dr. Pirrie, we agreed that the following was a suit*able case for* the operation.

R. M——, aged twenty-three, of a nervous and restless temperament, had suffered from reducible right oblique inguinal hernia, of the size of a hen's egg, for three years, accompanied by a small hydrocele. He was exceedingly anxious to have the hernia permanently cured. As he did not pay much attention to the adaptation of his truss, the hernia was gradually increasing in size. At his request I operated (and chose the manner described above) on the 3rd of November, at 8 P. M. He had a grain of opium at once, which was repeated by my orders at 9 P. M., and a little cold beef-tea when desired.

Nov. 4th. Good night; slight tenderness over the wound.—9 P.M.: Passed water; general uneasiness, and some slight tenderness in right iliac region.

5th. Took half an ounce of castor oil; pain towards right iliac region; testicle retracted. Oil operated slightly.

6th. Wound dressed; purulent discharge, redness, and tenderness entirely local.—7 P.M.: Had an attack of colic, which was relieved by camphor and assafœtida pill.

Dec. 17. Not the least impulse on coughing; parts solid. Cured.—*Lancet, March* 4, 1871, *p.* 304.

49.—FEMORAL HERNIA RADICALLY CURED BY OPERATION.

By Samuel Wood, Esq., Shrewsbury.

[The patient, a female, thirty-seven years of age, was admitted into the Salop Infirmary with a strangulated femoral hernia.]

Chloroform having been given, the sac was cut down upon, but not opened; the strictured portion at the neck was divided, and with a little gentle pressure, the contents, consisting of intestine and omentum, returned. It then occurred to me that, if I could detach the sac from the surroundings and invaginate it, and retain it in this inverted position, the raw surfaces would form adhesions, the opening be thus plugged up, and a radical cure be effected. Acting on this idea, I carefully detached the sac, and easily succeeded in pushing it through the openings, and so invaginating it. In doing so, I could with my finger detect, through the sides of the sac, the opening of the crural ring and the edge of Poupart's ligament, and feel the end of my finger, covered by the inverted sac, well within the cavity of the abdomen. The sac being secured in this position, the external wound was closed with wire sutures and strips of adhesive plaster, over which compresses of linen were put, and the whole secured by a roller applied in the usual manner. Forty drops of Battley's solution were given. Has vomited once or twice after the operation, but all the urgent symptoms were relieved. In the evening the bowels were moved.

9th. Doing well; no sickness. Beef-tea, milk, tea.

10th. The dressings were removed, and the edges of the wound found to have united beautifully.

11th. There is a little redness on the edges of the wound, and they appear as if they would separate; a little discharge from one part.

12th. The edges have separated nearly the whole length, and I can see a funnel-shaped depression, with granulating sides, being the inverted sac. She was allowed some wine and a more liberal diet.

From this time the case progressed uninterruptedly; the wound filled up and healed, and a pad was kept on the part to retain it in position until the parts became consolidated. She was discharged cured, and had a truss applied. I saw her some months after, and the part appeared consolidating. She was wearing the truss, and there was no hernial protrusion. I again visited this patient twelve months after the operation; the parts had become quite consolidated, and there was no hernial protrusion.

I am not aware that this plan of permanently closing the opening, and thus radically curing femoral hernia, has ever been done or suggested before. It appears to me so easy and natural a proceeding, and one attended with so little danger, that I trust the publication of this case may induce

others to try this plan of operating. It may, however, happen that I am here recording what has long ago been done by others, though I have never found any notice of such an operation.—*Lancet, Jan.* 7, 1871, *p.* 10.

50.—ON THE TREATMENT OF FISTULA.

By J. Cooper Forster, Esq., Surgeon to Guy's Hospital.

Fistula opening externally.—B. P., æt. 55, admitted August 24th into Luke Ward; of good general health; works as a smith; no history of syphilis or phthisis. About two years ago an abscess appeared, without any cause that he is aware of, on the left side of the anus. This burst and discharged offensive pus; it has continued to run ever since; no pain; he has had piles, which have got well.

On examination a sinus was found, opening on the left side of the anus, extending upwards about two inches by the side of the rectum. The probe could not readily be passed in the bowel, though the end of it could be felt through the mucous membrane.

25th. A probe director was passed without any difficulty and without pain apparently through an opening into the bowel, just within the sphincter, and the end was brought out through the anus; the probe was then freed with the knife, and the wound dressed with lint dipped in oil.

26th. The lint was removed, and the patient ordered to keep the parts clean; a piece of lint was applied to sop up discharge. He was to remain in bed a few days.

September 3rd. Wound granulating; no pain; discharged convalescent.

Fistula opening internally.—J. G., æt. 28, admitted August 29th; railway guard; general health good; no syphilis; no phthisis. Was quite well up to three months ago, when he noticed a swelling which he could not account for near the anus. It was so painful he was obliged to leave off work. Six weeks ago it burst into the gut.

On examination an induration, which was very painful and tender, was found running forward for two inches from the anus along the right side of the raphé of the perineum. On examining the rectum with a speculum an opening was seen on its anterior wall about one inch from the anus.

30th. An incision was made from the rectum into the hardened part, and the wound was dressed as in the former case.

September 8th. Patient in a good deal of pain.

12th. Upon examination to-day a sinus was discovered running forwards, which was laid open and dressed as before.

22nd. Doing well; merely keeping the parts clean, and applying a little bit of rag for the sake of cleanliness.

30th. Patient to get up.

October 12th. Wound filling up; patient very comfortable.

Discharged convalescent.

The first of these cases was one of the most common form of fistula, with an opening externally, and one also within the gut. Though not always easily detected, there is scarcely any doubt to be entertained that upon careful examination an opening—it may be very small—is to be discovered in most cases of fistula of any standing; it may be sometimes at a considerable distance up the gut, but most frequently just within the external sphincter; and there is no doubt, also, that the division of that muscle is all that is required for the perfect cure of the trouble. But no more than the division of the external sphincter is necessary, and this is most easily accomplished in the manner I have directed my dressers now for many years to adopt,—and in all my private cases I have used the same procedure. A grooved probe is passed along the sinus into the gut, and by passing the finger into the rectum, the end of the probe by a little manipulation is *pulled down* out of the anus; a knife is then run along the groove in the *probe*, and thoroughly and perfectly divides the sphincter, and lays the

sinus open. I feel satisfied that this is the easiest, simplest, and most efficient plan for dividing the sphincter ani externus, and it is only that muscle that need be divided. I should not dwell upon this excessively simple plan of performing this operation, did I not find the old orthodox recommendation of a blunt-pointed bistoury run along the sinus, the finger introduced into the rectum, and both withdrawn at once so as to divide the sphincter, still recommended in text-books of surgery, and diagrams showing the operation as thus performed still depicted in standard works. In the operation thus performed there is a chance of wounding the operator's finger, and there is a prospect of not thoroughly dividing the sphincter, both of which results are entirely set on one side by the operation I am in the habit of performing.

In the second case there was no opening externally, nor any internally; there was merely a large abscess in close proximity to the rectum, and which very shortly would have established a communication with the gut and the external parts. I therefore thought it advisable to adopt the plan I believe first recommended by the late Sir B. Brodie, and pass the knife, guided by the finger, into the rectum, cut outwards into the abscess through the sphincter at once, thus making one operation answer instead of two. This operation, however, unless performed with Brodie's knife, or unless in skilful hands, is not unlikely to be attended with failure, from want of thorough division of the sphincter. Brodie's knife, I may here observe, is one which is shaped like a bistoury; but the outside edge is sharp instead of the inside, thus facilitating the complete division of all the structures between the gut and the abscess. Of course a well skilled hand would easily do the same with a straight bistoury. To show that the failure is not a fanciful one, I may observe that in this second case the dresser failed, in the first instance, to divide the parts perfectly, and hence the necessity for the second operation.

In dressing these cases after the operation a piece of lint, placed in the wound directly after the division of the sphincter, and kept there until the bowels are open, is, I believe, all that is necessary. There is not the slightest necessity, so far as I know, for what is called dressing the wound daily by stuffing a piece of lint to the bottom of it, so as to prevent adhesion of the edges. No such adhesion is at all likely to take place, and I do not believe it to be possible. I need hardly observe that cleanliness is a necessity where there is so large a discharging surface.

I have not adopted any other mode of procedure for many years than the one I here recommend for the after treatment of all cases of division of the sphincter. I doubt very much whether the horror with which the public mind is imbued in the matter of "cutting out a fistula" has not something to do with the protracted after attendance, and the unnecessary complication of the operation itself.—*Guy's Hospital Reports*, *vol.* xvi., 1870–71, *p.* 363.

51.—ON THE TREATMENT OF PILES.

By Dr. G. H. B. Macleod, Professor of Surgery in the University of Glasgow.

In several cases of this most troublesome affection treated during the last six months, an operation similar to that employed on the tongue for epithelioma was performed. A long pin was made to transfix the base of the pile (after the patient had extruded it by pressing over hot water), and then, when he was under chloroform, a free incision was made on the skin side, encircling all the tissue to be removed, and the chain of the ecraseur passed over the pin and into the groove so formed. This has usually to be repeated on each side of the anus. In a few seconds the operation is completed, and a comparatively small wound (from the pressure of the chain) remains, which rarely gives out any blood. As compared with the ordinary ligature, this method of removing piles is very superior. It is more quickly effected, the suffering *for many* days which precedes the separation of the strangu-

lated mass is avoided, there is rarely any retention of urine (and if at all, only for a few hours), and the period of confinement to bed is greatly abridged, as the closing of a granulating wound is all that has to be accomplished. The whole circumference of the anus should never be grasped at once, as such a mode of proceeding is apt to be followed by a temporary closure of the bowel, and hence much annoyance from retained flatulence. I never use any dressing after operation except a wet sponge. No stimulating wash should ever be employed. Cleanliness is all that is required. If the pain is great, morphia may be injected subcutaneously, and in all cases it is well to keep the bowels at rest for two days, and then give a dose of oil. I have never had any trouble, however, when the precaution as to keeping the bowels quiet was neglected, if the wound was only carefully cleaned after stool. The disagreeable feeling of dryness and tension which occasionally follows the operation, can always be relieved by renewing the moisture on the sponge and applying it hot.

The use of the pin and a deep groove on the skin side is very important, as it insures the removal of the whole mass, and keeps the chain to the point where we wish it to act. I have now employed this mode of operating for a considerable time, and find it everything I could desire.—*Glasgow Medical Journal, Nov.* 1870, *p.* 8.

52.—A CASE WHERE AN ARTIFICIAL PLATE WITH FALSE TEETH WAS ACCIDENTALLY SWALLOWED, DISLODGED, AND ULTIMATELY PASSED BY THE PATIENT.

By Henry Smith, Esq., Assistant-Surgeon to King's College Hospital.

The interesting cases of lodgment of artificial teeth by Mr. George Pollock, and the extraordinary instance of the passage of a gold pencil-case through the intestinal canal reported by Sir William Fergusson in the pages of the Lancet, must be familiar to the profession. To these I have now to add a case of much interest, where a very ugly foreign body was got rid of safely, partly by the efforts of surgery and partly by those of nature.

On the night of November 30th, 1870, I was summoned to Mitcham by Dr. Hamilton, who had the wisdom to telegraph the nature of the accident; and I thus went down with suitable instruments. I found a corpulent butcher in great distress, he having six hours previously, by some means or other, allowed his false teeth, with their plate, armed with most formidable hooks on either side to slip down his throat. He at once sent for Dr. Hamilton, who, on passing his finger down into the pharynx, could distinctly feel the foreign body on the right side; but, unfortunately, he had not the requisite instruments, and in his endeavours to dislodge it, the body got out of his reach.

On my arrival, the patient pointed to just above the clavicle on the right side as the spot where the intruder lay. I at once passed a long pair of crane-bill œsophagus forceps, and imagined I could feel the foreign body, but I could not catch it. I tried carefully again and again with other instruments; but, as considerable bleeding ensued, and as there was great distress on the part of the patient, I determined to push the body down into the right stomach, and with that view passed a full-sized œsophagus bougie into the stomach, when the sensation of the presence of the tooth-plate at once ceased.

The patient was ordered to keep perfectly quiet, and to take plenty of gruel porridge and oil. He had no pain at all except for about five hours on the day the foreign body passed away, which event happened nine days after I had pushed it down. The patient has suffered nothing since.

I am aware that it is a dangerous practice to adopt the course I did in this case. I know of two instances were death followed this plan of treatment, one of them from hemorrhage; but I am not sure that prolonged and *forcible attempts* to extract such a formidable-looking body would not be *attended with* as much danger; and there are so many instances on record

where such ugly bodies have passed through the intestinal tract with safety, that the surgeon is quite justified in resorting to the expedient I adopted, providing he has first made an effort to extract the substance. The attempts I made were quite sufficient to tell me that I should not succeed in extracting the false teeth; and, indeed, I necessarily put the patient to so much pain and distress, and brought about so much bleeding, that I was only to glad to desist from further attempts. If these attempts do not succeed at once, they are not likely to succeed at all. Remarkable cases have occurred where such foreign bodies have been extracted, and among others, one happened in the practice of Dr. Vine, who succeeded in extracting with a probang a plate, armed with seven false teeth, an inch and three-quarters in length, and which had become engaged in the lower part of the œsophagus.—*Lancet, April* 1, 1871, *p.* 440.

53.—REMOVAL OF A LARGE NASO-PHARYNGEAL POLYPUS WITH WIRE ECRASEUR.

By Dr. Thomas Hayes, Medical Officer, Shanagolden Dispensary, Ireland.

J. O'Sullivan, æt. fourteen, the son of a labourer, strong and healthy looking, consulted me in the month of May in the present year. "About 2½ years ago he found his left nostril stopped, he could not breathe through it," it bled occasionally and sometimes considerably; latterly he found a great deal of trouble in breathing, a choking sensation and frequent vomiting; gradually he began to feel drowsy, and for some time before he came to me whenever he rested during the day he dropped off into a *snoring slumber*. His father told me "he was always asleep or going to sleep," which I believe was not a very exaggerated statement, as I found whenever he came to consult me and waited any time before being attended, he usually dropped off into a deep and stertorous sleep, reminding me of the peculiarity which Dickens attributed to Pickwick's fat boy, and which, until then, I regarded as the most extravagant flight of fancy on the part of the great and gifted novelist. He spoke with a very nasal utterance, as one suffering from a severe attack of inflammation of the fauces; his appetite was small, but he had no difficulty in swallowing. He consulted three doctors before coming to me: one said there was nothing wrong with him; the second was unable to decide what was his complaint; and the third advised him to go to Dublin to get a "chance of his life," as nothing could be done for him at home. He was recommended to me as a *dernier ressort*, by a gentleman of the county who entertained very faint hopes of a successful result for the poor boy. After having heard the history of the case, and having made a slight examination, I came to the conclusion that I had a polypus to deal with, but on carefully looking into the nares no trace of a polypus could be detected; yet the left nasal passage was occluded as no air could be driven through by a forced expiration; but I succeeded in injecting water through the nose into the pharynx. The right nasal passage was partially obstructed; on looking into the mouth the soft palate was seen depressed and convex resting on the tongue. I raised up the palate and tilted up the uvula, and looked into the fauces which presented nothing abnormal: but I did not succeed in getting a glimpse of the overlying tumour, which seemed to have stretched the curtain of the palate; but did not appear beyond its arches. I examined with the finger, and found the tumour pressing on the palate; but my exploration was not sufficiently exhaustive to ascertain its nature; for as soon as my finger extended beyond the arches of the palate, the boy got such a fit of suffocation and vomiting, that I was forced to desist. With a view to try and ascertain the situation and extent of the obstruction, and with a hope—should it prove to be a soft polypus—of detaching it or drawing it into the nasal fossa, I passed an elastic catheter, armed with a strong ligature, through the nasal cavity into the pharynx. There was some difficulty in getting the catheter past the obstruction, but it ultimately glided down by the *left side of the pharynx*, which lead me to believe that the tumour

was attached more towards the mesial line than in the vicinity of the turbinated bones or fossa, the usual *habitât* of polypi. I brought the ligature forward through the mouth, attached a small plug of lint, and guided it over the palate as in plugging the posterior nares, and then drew it forward through the anterior nares. No result followed; the polypus was neither displaced nor detached, but I found the throat less sensitive to digital examination.

I again tried to pass my finger *over* the arch of the palate, and I succeeded this time in ascertaining the nature and size of the tumour. I found it round, smooth, and hard, filling up the space between the posterior nares and the back of the pharynx, resting, with the intervention of the palate, on the dorsum of the tongue, occasionally dipping into the opening of the glottis, and producing spasmodic choking fits, which the father stated, so terrified himself, that he was unable to sleep at night for some time before the operation was performed, lest his son should die in one of them.

I determined on removing the tumour with Maw's wire écraseur for nasal polypi. I ordered the instrument, and in the meantime the tumour grew so much, that when he came to me on the 4th of July to have the operation performed, the tumour had grown so large, that it was only necessary to raise the uvula to see a smooth, whitish, rounded body, almost completely blocking up the breathing channel between the nares and larynx. I tried to ascertain its point of attachment by passing my finger about it, but the only thing I could ascertain was, that I could put the loop of wire over it, and so secure its being securely ligatured.

The Operation.—I passed a catheter, armed with a ligature, with some difficulty, through the nose into the fauces: I drew one end of the ligature out of the mouth, I withdrew the catheter, and with the ligature pulled the wire looped through the nose, and brought it forward into the mouth: I attached both ends of the wire to their proper place in the écraseur, moving the instrument into the nose. I stood behind the patient, and pressed with my fingers the loop of wire over and in front of the tumour. I kept my fingers on the tumour to prevent the wire slipping off, while my friend, Dr. Madigan, who gave me valuable assistance, turned the handle of the écraseur to tighten the noose and strangulate the tumour. After a little the wire came away, but the tumour was not detached; I then came to the conclusion that the tumour grew from above, and not from the floor of the nose, as one would suppose from the catheter passing outside and behind it; at all events, I felt sure that the loop should pass over *behind* the tumour, I passed the armed catheter again, and this time with two ligatures, to leave one in for an emergency—a very wise precaution as it proved. I pulled the wire through as before, passed the loop behind the tumour, kept the top of both index fingers steadily on it, to prevent the loop passing over it. When the écraseur was worked, it was very soon evident that something was caught in the loop, at which the wire had some tough work; the boy screamed as it tightened, but on the whole bore it very well without chloroform. After a few more turns of the handle of the écraseur, to my great discomfiture, the wire yielded to the resistance offered by the tumour—a coil of three wires broken by the roughness of a nasal polypus! Who would suppose such a thing? But I must say that the wire did not seem to me to be good, and the tumour was very firm. I then tried the strongest wire of the three sent with the instrument. The supplementary thread left in the nose was now of service (a double one was inserted); the loop of wire was pulled through and adjusted round the neck of the tumour; the écraseur was worked as before. I kept my fingers on the tumour, which I found was fairly encircled this time, but I now wished to guard against its dropping into the pharynx, and causing suffocation. After a little, the wire came through the foramen of the écraseur. The tumour did not drop down on my fingers immediately; I feared a failure after all—but hold! I find it loose, ready to fall down. I pressed the head forwards, and never removed *my fingers* from beneath it until it dropped out of the boy's mouth on the *floor*. I gave a sigh of relief—of joy. What a glorious success due to

French ingenuity! I could have elevated Chassaignac to the seventh heavens, so effectual, so decisive was the success obtained by his charming invention. There was no hemorrhage, except a slight oozing after passing the catheter. The patient has felt quite well since the operation. The drowsy symptoms presented in this case were, in my opinion, due to imperfect arterialisation of the blood, and not to any pressure from the nose on the base of the brain. The tumour proved to be a fibrous polypus. It was removed with as clean a cut as if done with the knife.—*Medical Press and Circular, Nov.* 16, 1870, *p.* 391.

ORGANS OF URINE AND GENERATION.

54.—OBSERVATIONS ON THE TREATMENT OF A HUNDRED CASES OF STRICTURE OF THE MALE URETHRA, BY GRADUAL AND IMMEDIATE DILATATION, EXTERNAL AND INTERNAL URETHROTOMY.

By Dr. William Stokes, Jun., Surgeon to the Richmond Surgical Hospital, Dublin.

[The hundred cases of stricture, the comparative success of the treatment of which according to the method adopted forms the subject of inquiry in the following paper, were treated as follows.]

First—Gradual dilatation.
Second—External urethrotomy.
Third—Internal urethrotomy.
Fourth—Forced dilatation.

For the treatment of ordinary uncomplicated cases of stricture by gradual dilatation, I must unhesitatingly give the preference to the French "bougies olivaires," and "bougies à boule."

There are some warm advocates for the treatment of stricture by laminaria bougies, but there is one very great objection I have to them, which is, that owing to the dilatation of the laminaria beyond the seat of the stricture, the difficulty in withdrawing the instrument is, in most cases, very great, and is generally attended with considerable pain.

There can be no doubt that, although the treatment by gradual dilatation is the slowest, it is unquestionably the surest and safest method, and the one which, judiciously carried out in practised hands, is least likely to be followed by relapse.

The operation of external urethrotomy is certainly one of the most difficult, if not the most difficult operation in surgery. This great difficulty arises from many causes, among which may be mentioned, the abnormal condition of the parts to be divided, the impossibility in the great majority of cases of introducing from the wound in the perineum any guide into the bladder, and also the division of the stricture at so great a depth from the surface. Several methods have been devised for performing this operation, among which may be mentioned, the procedures of Hunter, Arnott, Guthrie, Wheelhouse and Gouley.

In Hunter's operation "a catheter was first introduced as far as it would go, as a director, and all the sinuses were laid open to that catheter, which exposed near an inch in length of that instrument; then the catheter was in fact withdrawn, to expose that part of the urethra which was laid bare. The blood being sponged off, the orifice in the stricture was next searched for, and when found, it was dilated. The catheter was now pushed on to the bladder, although with some difficulty."

Mr. Arnott's operation consisted in cutting down on the point of a sound carried down to the stricture, and then passing a small grooved probe through, and dividing the stricture. Mr. Guthrie recommended opening the urethra behind the stricture, and dividing the contraction by cutting from behind forwards. The full particulars of these procedures will be found in the chapter on "Perineal Section," in Sir H. Thompson's classical work on *Stricture of the Urethra.*

In Mr. Wheelhouse's operation a curved staff, grooved on its convexity, is passed down to the stricture, and the forefinger of the left hand being introduced into the rectum, a scalpel is then entered with its back to the rectum, immediately in front of the anus, and the perineum is opened by cutting upwards and forwards. The urethra is then cut into, not at the point of the instrument, but into the groove of the staff, a quarter of an inch or so above the point. Each lip of the opened urethra is then seized with a forceps, and with these the canal is drawn open. The position of the staff is then altered. It is reversed, the point turned out through the opening, and made use of to draw forwards and steady the urethra. "If the parts are now carefully sponged, I have now," Mr. Wheelhouse observes, "the interior of the canal so fully exposed to *view* that I can steadily follow its upper wall; this I do with a fine probe director, until I have cut my way completely through the strictures, and have come out into the dilated part of the urethra, which usually lies behind it, or, as sometimes happens, into a second or more strictures; this effected, I am generally able to pass the small director, which I have been using, immediately onwards into the bladder. Having reached the bladder with that, I turn the groove downwards; with a straight probe-pointed bistoury run along it; I make sure of the division of any further obstructing bands, and finally, I completely open up the prostatic urethra by sliding along the groove of the director the little instrument, the 'probe-dilator,' an instrument introduced by the late Mr. Teale, for use in lithotomy, and thus obtain a broad metallic floor, upon which I can, without any danger of failure, introduce a catheter of even the largest size."

Professor Gouley's operation, ingenious though it doubtless is, does not appear applicable to the kind of strictures which hitherto I have treated by external urethrotomy. They were all *truly impermeable strictures*, not allowing the introduction of the finest capillary bougie. In Mr. Gouley's procedure, a fine whalebone capillary bougie is introduced in the first instance. "The next step is to introduce a No. 8 grooved metallic catheter, with a quarter of an inch of its extremity bridged over, so as to convert the groove into a canal, the bridged portion itself being also grooved. Its introduction is accomplished by passing through the canal the fine end of the retained guide, then holding the latter steadily between the thumb and index finger of the left hand, and pushing the catheter-staff gently into the urethra, until its point comes in contact with the face of the stricture. The staff and guide are then kept in position by an assistant, who at the same time, supports the scrotum. The patient is placed in the lithotomy position, and held by two assistants, or better, by the aid of Pritchard's anklets and wristlets." The surgeon should then make a free median incision, extending from the base of the scrotum to within half an inch in the margin of the anus. Having exposed the urethra, the contrivance of Mr. Avery, of passing a loop of silk through each edge of the incised urethra, and each loop of silk is held by the assistant in charge of the corresponding limb,—"When the urethra is opened and the loops are secured, the catheter is withdrawn a little, so as to bring into view the black guide, then the stricture with about half an inch of the uncontracted canal behind it, is divided." The concluding step of the operation is to pass the catheter-staff, guided by the whalebone bougie, into the bladder; but should it be arrested in its course, the knife must be re-introduced, and the incision extended further back."

The method which was adopted in the following cases differs in some respects from those I have above alluded to, and will be best understood by a reference to the cases.

Case 1.—*Stricture of Urethra, of sixteen years' duration, complicated with Perineal Fistula; External Urethrotomy; Recovery.*—M. H., aged sixty-two, was admitted into the Meath Hospital, under my care, on December 16, 1867, suffering from urethral stricture and perineal fistula, the latter complication having existed for upwards of six years. For some time after his admission, I made numerous but unavailing attempts to introduce an

instrument into the bladder. Neither the filiform bougie of Maisonneuve, or the catgut director of Dr. Hutton's railway catheter, or the finest of the self-dilating sea-weed bougies, could possibly be introduced. On consultation with my colleagues, I determined to perform external urethrotomy. Accordingly, on the 18th January, 1868, the patient was brought into the operating theatre, and placed in the lithotomy position. A large silver catheter was introduced into the urethra down to the seat of the stricture, and held firmly in that situation by my friend, Mr. Wharton. I commenced the operation by making an incision with a long straight bistoury along the raphe of the perineum, terminating at a point about three quarters of an inch in front of the anus. The soft parts were divided freely down to the extremity of the silver instrument, which rested against the stricture. I then introduced, and with the nail of my left index finger felt distinctly the contraction beyond the point of the large silver catheter. The stricture I then succeeded in dividing with the point of the straight bistoury, which I used in the first instance for making the external incision. In doing this, which required the most delicate manipulation, I took especial care to keep the handle of the bistoury well depressed. With greater facility than I had at all anticipated, I arrived at the dilated portion of the canal, beyond the seat of the stricture. I then took a full-sized gum-elastic catheter, without any stilette, which I fortunately succeeded in introducing into the bladder, through the wound. The next difficulty I had to encounter was to bring the fore part of the catheter through the anterior portion of the urethra. For accomplishing this, I had recourse to a manœuvre which Mr. Porter suggested, and which was attended with complete success, and I can recommend it most strongly to all surgeons who have to deal with similar cases. It consists in removing the ivory head of the catheter which was introduced through the wound into the bladder in the first instance; secondly, in introducing through the orifice and anterior portion of the canal a conical-shaped bougie, the extremity of which, when brought down to the wound, was fixed firmly into the open end of the gum-elastic catheter. The bougie is then slowly withdrawn through the anterior portion of the urethra, bringing along with it the gum elastic catheter. The two instruments are then separated, and the catheter fixed in the urethra in the ordinary manner. This case progressed most favourably. The wound in the perineum slowly but eventually completely closed, and when the patient left hospital, the largest sized catheter could be introduced with facility into the bladder.

Case 2.—*Impermeable Urethral Stricture of ten years' duration: External Urethrotomy; Recovery.*—The following case of impermeable urethral stricture illustrates even more fully than the preceding one the great practical value of external urethrotomy.

David E., aged thirty-three, a sailor by occupation, was admitted into the Richmond Surgical Hospital, on December 18, 1869, suffering from a close stricture of the urethra. He stated that about ten years ago, while in London, he contracted gonorrhœa, of which he was never perfectly cured. A gleet was the result, which, in consequence of his irregular mode of living, and frequent exposure to wet and cold weather, became chronic. About a year after he contracted the gonorrhœa, he perceived he was unable to expel the urine in as full a stream as was natural. This state of things continued without his seeking for any surgical advice, until at last he was only able to void his water drop by drop.

About three months previous to his admission to the Richmond Hospital, while helping to unload a cargo of timber with which the ship in which he was employed was freighted, a heavy log of wood struck him on the testicle, which soon after swelled greatly, and difficulty of passing water greatly increased. He then consulted a practitioner in Wales, who recommended him to come to Dublin for surgical treatment. On examining the patient, I determined the existence of a dense cartilaginous stricture, at the membranous portion of the urethra. For upwards of ten days or a fortnight, I made frequent but unavailing attempts to pass the smallest catheter,

and I found that not even the introduction of the filiform bougies of M. Maisonneuve was possible. The symptoms of retention of urine at this time became so extreme, and the bladder became so enormously distended, that my clinical assistant fearing a vesical rupture, sent for me, and, after a final attempt to introduce an instrument proved unavailing, I determined to perform a perineal section.

Accordingly, at 4 P.M., on Sunday afternoon of January 2, the patient was brought into the operating theatre, and brought under the influence of chloroform, and I then proceeded to perform external perineal urethrotomy. I may say, in truth, that in consequence of the failing light, the great depth of the perineum, the violent struggles of the patient, over whom chloroform had but little effect, and the great length of the stricture, through which no instrument could be introduced for a guide, this was by far the most difficult surgical operation it has ever been my lot to perform.

It is unnecessary to go through in detail the steps of the operation I performed, which lasted fully an hour and a half and the various but fruitless efforts I made to introduce an instrument, when I believed the stricture was sufficiently divided. The great length and depth of the stricture and the failing light were doubtless the chief causes of the extreme difficulty I experienced. However, my efforts were at last rewarded, and to my no slight satisfaction, I succeeded finally in introducing a large silver catheter, and drawing off an enormous quantity of fœtid urine. The instrument was then secured in the bladder, and the patient sent back to his bed, and got immediately a powerful anodyne. Five days after the operation, No. 6 gum-elastic catheter was introduced without any difficulty, and the wound in the perineum was found to be rapidly closing. Very little urine succeeded in getting through the perineal wound. Ten days after this the perineal fistula was found to be not larger than the head of a large pin, and this I succeeded in effectually closing by a plastic operation, and on the 28th February the patient left the hospital, the largest instruments being passed without the slightest difficulty, and the perineal fistula being completely closed.

Internal Urethrotomy.—There are, as is well known, many ways in which this operation is performed, the majority of which procedures are described more or less fully in most of the works which have been published on the subject of urethral stricture. In none of these published in Great Britain, so far as I am aware, is there any, even a brief description of the method of internal urethrotomy, which I introduced into practice in this country, and which was, I believe, originally devised by M. Maisonneuve, of Paris. Although I have for some years had occasion to perform the operation from time to time, many of my professional friends are still unaware of the steps of the procedure, and I feel, therefore, that no apology is necessary for giving, before the records of my cases, a brief description of the operation.

The first step in the operation is the introduction into the bladder of the very fine and delicate filiform gum-elastic bougie which is not thicker than the double-lengthened cat-gut guide for the "railway catheter" of Dr. Hutton. This being introduced past the stricture into the bladder, the second step of the operation is the attachment of the grooved steel director to the end of the filiform bougie, by means of a screw. When this is firmly fixed, the introduction of the director commences, the bougie being slowly pushed before it into the bladder, within which it coils. Seldom any difficulty attends this stage of the operation. The third step is the division of the stricture, to effect which the triangular-shaped urethrotome is passed along the groove, situated either on the concavity or convexity of the steel director, in doing which the stricture is divided, but no other part of the urethra is in the slightest degree wounded. This constitutes one of the chief advantages of this operation; that no part of the urethra, either in front of, or behind the stricture, can be divided, an advantage not possessed by any other cutting operation for stricture. This preservation of the urethra from being wounded is effected in the following manner:—The projecting angle of the triangular-shaped urethrotome is blunt, so that its contact with the

urethra cannot be productive of any wound or injury whatsoever. The part, however, of the urethrotome between the angle and its extremity is sharp, but does not wound the normal part of the urethra, as this is guided off the cutting portion of the urethrotome by the blunted projecting angle. When, however, the stricture is arrived at, this cannot take place, and this portion of the passage comes necessarily in contact with the cutting edge of the urethrotome which divides it; but no portion of the urethra, either in front of, or behind the stricture, can be wounded. When the division of the stricture is completed, the instruments are at once withdrawn, and a large-sized catheter is introduced. The deviser of the operation has recommended for this purpose catheters made of vulcanized Indian-rubber, which, from their great pliability and softness are very grateful to the patient; but I have found that in some cases their softness and pliability renders their introduction a matter of some difficulty. Although it is desirable, after the operation, that an instrument should be introduced, it by no means follows that the introduction of one is absolutely essential to the success of the operation. In one of the cases that occurred in my hospital practice, after the division of the stricture, I could not succeed in getting in an instrument, and the patient was consequently left without one in the urethra, and nothing could have been more gratifying than the result of this case. On the eighth day after the operation the patient, in the presence of a large class, passed water in a full, strong, and continuous stream, after which I passed No. 10 catheter with the greatest ease. A similar circumstance occurred in a case that was operated on in the Richmond Hospital, by Mr. Fleming, and it ultimately did well. It is, however, much better that an instrument should, if possible, be introduced.

I may now proceed to detail, as briefly as possible, the particulars of twelve cases of urethral stricture, which I have operated on by this method.

Case 1.—*Stricture of the Urethra of twelve years' standing, from a fall on the Perineum; Internal Urethrotomy; Recovery.*—William G., aged thirty seven, a painter by trade, was admitted into the Meath Hospital under my care, on October 5, 1864. The patient stated that eighteen years ago he fell on a bar on his perineum, and about five years after that he first observed a difficulty in passing water. The case had previously been treated by gradual dilatation, by sea-weed bougies, with such success that at the time the patient left the hospital, No. 9 catheter could be passed with facility. Since that time, however, the stricture gradually returned, and at the time of his second admission into the hospital, No. 2 catheter was the largest instrument that could be introduced. I then performed the operation in the usual way, and after its completion attempted to introduce a large sized instrument, but without success. I then left the patient in bed without any instrument being in the bladder. On the 6th day after the operation, I again attempted to introduce an instrument, and succeeded with facility in passing No. 10 catheter. The patient then left the hospital.

Case 2.—*Stricture of the Urethra, of eight years' standing; Internal Urethrotomy; Recovery.*—Thomas M., aged fifty, was admitted into the Meath Hospital on September 16, 1864. The stricture, situated in the membranous portion of urethra, was of eight years' standing. The etiology of it was involved in some obscurity, as there was no evidence of the urethra having been injured in any way, or of the patient ever having suffered from gonorrhœa. No. 3 catheter was, with considerable difficulty, introduced on the day of his admission into hospital.

On Sept. 18, I operated in a similar manner as in the first case I have alluded to, and, immediately after the operation, introduced one of the large vulcanized Indian-rubber catheters, the size of which corresponded to No. 10 of the ordinary gum-elastic catheter. This instrument was kept in the bladder for three days, and then withdrawn. Nothing could have been more perfectly satisfactory than the way this case progressed, for, after the operation, there was no hemorrhage, no pain, and no evidence whatever of any constitutional disturbance. On the 25th Sept. I was enabled to pass

No. 12 gum-elastic catheter with the greatest ease, and the patient then left the hospital.

Case 3.—Stricture of the Urethra of twelve years' duration; Internal Urethrotomy; Recovery.—W. B., aged forty-two, was admitted into the Meath Hospital on October 20, 1865. He stated that he had suffered from urethral stricture for upwards of twelve years, and ascribed the disease to repeated attacks of gonorrhœa, which he had had during his youth. For many years previous to his admission into hospital, he was in the habit of having instruments passed from time to time. Of late considerable difficulty was experienced in doing so, and when he came under my observation in the Meath Hospital, No. 3 catheter was the largest instrument that could be introduced, and that by very delicate manipulation. October 28, I performed internal urethrotomy; in this case dividing the stricture on the under surface of the urethra. After the operation a large conical-shaped gum-elastic catheter was introduced without any difficulty, and kept in the bladder for forty-eight hours. During the convalescence the patient had no rigor or other evidence of constitutional disturbance. On November 5, the patient left the hospital able to pass water in a full and uninterrupted stream.

[Nine other cases are then related.]

In connexion with this operation, the following points are of considerable practical importance for the surgeon to bear in mind:

1. The operations should not be performed unless the grooved metallic director can be introduced with facility. Any forcing of this portion of the instrument into the bladder will, in the great majority of cases, be followed by rigors and other symptoms of constitutional disturbance.

2. The patient's bowels should be cleared by an enema on the morning of the operation.

3. Immediately after the operation, a full opiate with quinine should be given.

4. The catheter introduced after the operation should not be allowed to remain longer than twenty-four hours. If it is, it will probably give rise to irritation, and the formation of an abscess when the stricture is divided.

5. No instrument should be re-introduced for at least three days.

6. The patient should be kept on milk diet for forty-eight hours after the operation, and no stimulants given.

7. For some weeks after the operation, full-sized bougies or catheters, metallic or gum-elastic, should occasionally be introduced. M. Maisonneuve employs metallic bougies of a peculiar form, and there can be no doubt that the introduction of this form of bougie into the bladder can be effected with great facility.

With reference to the "immediate method," or method by rupture, I may mention that I adopted this procedure in eight of the hundred cases alluded to at the commencement of this record, and the results obtained were not such as to make me a very warm advocate for the operation. In three of the cases very violent constitutional symptoms supervened, and in all, with two exceptions, there was rapid recontraction. I cannot, therefore, avoid coming to the conclusion that of the two operations, rupture and internal urethrotomy, the latter operation is to be certainly preferred, as, in my experience at least, subsequent contraction less frequently occurs. In one operation the stricture portion of the urethra is divided by a single clean incision, and in the other the wound is necessarily a *lacerated* one. In estimating the merits of the two operations of rupture and internal urethrotomy, the following remarks of Sir Henry Thompson cannot but be read with deep interest, coming as they do, from a surgeon so justly renowned. Speaking of rupture, he observes—"It possesses the merit of simplicity, for provided the first instrument, a guide, is safely passed through the stricture into the bladder, the introduction of the large tube which effects the rupture is only a matter of force. No other operation for stricture is so easily accomplished, or is so unlikely to fail in its performance. To divide a stricture by any method *of incision* requires much more knowledge, practice, and tact; while it is, *I believe*, a more perfect proceeding in its results for really hard, old, and

contractible strictures than rupture. Without doubt, urethrotomy, whether external or internal (and the latter is mainly referred to here), is infinitely more difficult to perform neatly and completely." . . . . . "I am disposed to think at present that a well performed internal urethrotomy is more enduring in its results than any other operative proceeding."

It is held by some surgeons that no wound in the urethra is made when the bursting or rupture method is employed, but if this were the case, I would ask, where does the hemorrhage come from that is always present to a greater or less extent when this operation is *effectively* performed? That it comes from the forcible laceration of the urethral contraction, there can be little doubt. This constant occurrence affords sufficient evidence of the necessary production of a lacerated wound at the seat of the stricture, and one probably extending to a considerable distance in front of, and behind the situation of the contraction, and I cannot but think that subsequent contraction will take place more slowly in the case where the stricture is incised than in the one where it is forcibly lacerated and torn. The two operations, also, are obviously equally "immediate."

In conclusion I may state what I believe to be the principles that should guide the surgeon in the treatment of urethral stricture. First, that all cases in which it is possible to introduce a catheter or bougie, should be treated by the method of gradual dilatation, as, in skilful hands, it is the safest, and the most effectual. Secondly, that strictures which are impermeable to catheters should be treated by internal urethrotomy; and thirdly, that strictures that are impermeable to any catheters or bougies should be treated by external urethrotomy. The larger the experience I get of the treatment of urethral strictures, the more convinced I am that these are the principles that should guide us in treating this disease, and that all surgical practitioners of discretion, refusing to be misled by the dictatorial assumption of some who claim for other methods unvarying success, and universal applicability, will ultimately accept them.—*Dublin Quarterly Journal, Feb.*, 1871, *p.* 1.

55.—ON THE REMOVAL OF STONE FRAGMENTS BY SYPHON-SUCTION.

By Professor Dittel, of Vienna.

The problem in lithotrity has been, to make a fine detritus, and to float it out through a catheter, so that the urethra may not be irritated. Elaborate pumping apparatus have been devised for this end. The latest of these inventions (Robert Collin's) was exhibited to the *Gesellschaft der Aerzte*, by Dr. Mosetig. In order to criticise it, I must first explain the constituent parts:—1. A catheter of large calibre, with a short curve; the vesical end resembles the female branch of the scoop, it has only a posterior wall, the anterior wall of the open slit being closed by an obturator of bone, so that they may not wound the urethra walls in passing. 2. A closed glass cylinder with an opening in its axis before and behind. 3. A suction pump, the piston attached to a dentated bar, which is moved backward and forward by means of a toothed wheel with a handle attached.

The operation is as follows:—Several ounces of water having been injected through a catheter into the bladder, one opening of the glass cylinder is attached to the catheter, while the tap of the syringe is inserted in the other, and the contents of the bladder are drawn out with some force. With the fluid there comes out detritus, which sinks to the lower side of the cylinder, the water above it filling the cylinder. If now the water be driven back into the bladder from the cylinder, the sand wells up into the bladder, and on the next extraction-movement is withdrawn again, the sand sinks again to the bottom of the cylinder, the water above it remains; and this manœuvre is repeated till the water brings no more sand out with it.

The method *is altogether* excellent, but in application to the living

patient I have encountered difficulties which finally dissatisfied me with the operation. The following are the disadvantages of the procedure :—

1. The apparatus consists throughout of rigid materials, and it is impossible to perform the extraction and injection of the water without giving jolts. These jolts are unpleasant to the patient.

2. The force of suction acts very powerfully, and, as the extraction only occurs mechanically, the operator has no means of perceiving whether he is doing too much or too little. It may easily happen that the vesical mucous membrane presses so forcibly against the opening of the catheter as to become injured. I attempted to avoid shocks by interposing flexible tubes, but these were often closed by atmospheric compression before the fluid could be extracted from the bladder.

3. I will now explain how I was led to the construction of my own apparatus. First, let me mention the method which I apply, in my own consulting-room, for emptying the bladders of patients. In order to keep my sofa from being wetted, I attach to the external end of the catheter a long caoutchouc tube, the free end of which passes into a vessel standing on the floor; in this way the bladder empties itself completely, and not a drop of urine is spilled. In October of this year (1870), a day labourer had the misfortune to crush the dorsal vertebræ and a corresponding part of the spinal cord by a fall. He was admitted to Ward 42, and we then observed paralysis of the parts below the injury; the urine had to be drawn off with a catheter. When this was done, I found, from percussion of the bladder, that there was still urine left in the bladder, although none more escaped from the catheter. I attached an india-rubber tube, the free end of which passed into a vessel on the ground, whereupon a considerable quantity more of urine escaped before the bladder was emptied. The catheter and tube represented an ordinary syphon, and I had thus practical proof that the urine might be extracted from the bladder, by syphon-apparatus, in the same way as any other fluid from a vessel under similar circumstances. It was indifferent at what rate the urine might escape through the syphon; the only important matter was to determine whether the detritus in the fundus of the bladder could also be extracted by this method. This question was solved by an experiment in my room. I took a drinking glass, filled it with water, put some sand in it, and placed the tumbler on a chest; I now took a silver catheter with large eyes, attached a flexible tube to it, and carried the tube down below the level of the water. On the floor stood another glass vessel, empty. I now sucked the free end of the flexible tube, and then let it hang over the empty glass; immediately, the water flowed over, and also the sand, so far as the point of the catheter passed into the latter. I had now the experimental proof that the syphon would extract sand, and probably also calculus-detritus. As the contact of the catheter-eye with the sand was necessary for the extraction of the latter, I constructed a catheter similar to my *porte-remède*. It is especially short anteriorly; has, moreover, no eye; it is provided with an obturator, which can be pushed forward on the catheter stem with a screw-movement, and fixed. This closure is necessary to prevent the urethral walls from being injured by the edges of the opening. With this instrument and a long enough syphon-tube, one can extract even coarse detritus with great force. It now remained to apply the apparatus to the living subject.

Among the four patients with stone who entered Ward 26 at the commencement of this semester, there was one to whose case the apparatus was not merely applicable, but was really the only resource left. Herr K., 55 years old, had had cystitis in 1868, and in the winter of 1869 retention of urine occurred, as the climax of difficult urination that had lasted during the twelve months—probably in consequence of swelling of a bilaterally hypertrophied prostate. The first attempts at catheterism, at his own house, were badly managed and with poor results; and not till the beginning of 1870 was complete evacuation of the bladder effected, with a flexible catheter. A complete paralysis of the bladder remained. On the 3d of May the patient came to Vienna: I found pronounced catarrh of the renal pelves,

paralysed bladder, bilateral hypertrophy of prostate, and a phosphatic vesical calculus. As he could not pass a drop of urine himself, I could not reckon on the spontaneous discharge of the detritus, and, after consultation with my colleagues, undertook lateral lithotomy. The phosphatic stone crumbled in the extraction. The wound remained free, but on the 20th of May I had to open an abscess in the left side of the scrotum, and, on the 22d, symptoms like those of pyæmia developed themselves, only there was no jaundice. The rigors were alarming; during this week they recurred many times every day, once as many as twenty. Temperature reached 104° to 105·5° F. The febrile movement fortunately ended in an attack of cavernitis in the left side of the penis. On June 4 there was notable fluctuation; I made an incision, and for several days a considerable exfoliation of the necrosed erectile tissue went on. The healing of the abscess was very difficult, but was at length finally completed, the patient leaving the hospital on the 31st July, with only a very small sinus left.

On the 12th September, 1870, as I returned from my holiday-trip, I found the sad news that Herr K., had again retention. When I examined him, on the 17th, I found a phosphatic stone of 3 centimetres' diameter. I have already once seen the very rapid formation of a *catarrhal* calculus; but this catarrh, as seen in Herr K., did not appear intense enough to have produced such a stone in six weeks. It seemed much more likely that the stone had at first lain *perdu* in a diverticulum, and afterwards grown out of it. This opinion was made almost certain in the course of a lithotrity.

Under existing circumstances I had no choice, except either to lithotomise again, or to trust to good fortune and apply my stone-sucker to this living patient. I concluded on the latter course. On the 19th, I had the first *séance;* the patient did not suffer much, but in the four first operations I contented myself with the detritus, which I removed with the scoop. On the 15th October I first applied the suction-instrument. In all, I had two *seances* in September, five in October, four in November. On the 13th of November I concluded the operation with a final search, in which no trace of stone could be anywhere detected. In this case the apparatus had fully succeeded. Since that time I have several times had occasion to use the instrument—to discover its faults, and to improve it. In the first place, I saw that the curve of the catheter was too large; the sand is at the fundus, it was necessary to move the catheter round the bladder, and the greater the curve, the more the point rubs the bladder wall. I therefore made my next catheter with as short a curve as a scoop would have. A second fault was in the edges of the catheter-opening, which it was impossible to have so completely rounded off as not to rub the mucous membrane of the floor of the bladder; this is still more the case when the fluid and the detritus have been extracted, for now the syphon draws the mucous membrane into the opening. This entanglement can be set free by diminishing or stopping the suction, as by raising up the long arm of the syphon.

On these grounds I altogether abandoned the short catheter with the obturator for sensitive patients, and resorted, in such cases, to a closed catheter, with one large eye well forward, very near the point. The point as far as the eye must be filled up, that fragments may not get lodged there and cause injury to the urethra in extraction.

A third defect was this: in order to inject the water into the bladder, one had to take the tube out of the lower vessel. But in the moment when fluid no longer flows out of the bladder, air passes in; it is difficult to prevent this by compression of the tube; indeed, one drives the air in the tube into the bladder. The air may perhaps do no harm, but it is at least superfluous, and the passing in and out of air-bubbles is unpleasant to the patient, and delays the whole process of extraction. I have, therefore, fitted the handle of the catheter with a separate additional piece: this consists of a tube, six centimetres long, into the midst of which a tube, two centimetres in length, opens at right angles. The additional piece has three limbs,—catheter limb, outflow limb, syringe limb. Where these three tube limbs come together, there is a *stomach pump* valve-arrangement: in the first position of this the

can only be sent from the syringe to the bladder; in the second position the water can only flow from the bladder into the outlet tube. In this without removing the tube from the bladder into the outlet tube. In this w of air, and make the extraction almost continuous, as long as we k proper. There is no doubt that, by such continuous extraction, we e the patient the irritation from, and impaction of, fragments; and this learly a not unimportant argument in favor of the apparatus. But a yet re important merit is that its use eliminates paralysis of the bladder om the list of the contra-indications of lithotrity.

If we do not possess the additional piece and the stomach-pump action, nd do not know how to procure them, a common catheter with a good arge eye will sufficiently answer our purpose, only we must fill up the point with wax, and fasten a common india-rubber tube to the handle. The wider the calibre of the catheter, the better, because comparatively large fragments are extracted, and the still larger ones probably remain in the bladder for the next crushing.

In chronic catarrh of the bladder, also, the suction-apparatus is to be preferred, because the mucus and pus lying on the floor of the bladder, and acting as the *ferment* of the urine, can in no other way be so completely removed. If one does not thus absolutely cure the catarrh, at least an important symptom is got rid of. But one is often prevented from using instruments, which are technically just the right thing, because there are patients who only bear the use of an instrument with difficulty, and can only bear it once. There are constitutions in which a simple catheterism provokes urethritis. Such patients are not able to bear a suction process, and one is glad to complete the lithotrity at one operation. But whether such people are better for being left to expel the detritus by their own efforts, I am doubtful.—*Practitioner*, *March*, 1871, *p.* 130.

56.—ON DISEASES OF THE BLADDER REQUIRING THE RETENTION OF A CATHETER.

By Barnard Holt, Esq., Senior Surgeon to the Westminster Hospital.

[The following case is illustrative of the advantage of the employment of Mr. Barnard Holt's flexible winged catheter (Retrospect, Vol. lxi, p. 189). The treatment is equally applicable to cases of atony or paralysed conditions of the bladder, associated or not with enlargement of the prostate gland.]

Charles R., aged 52, a traveller, was admitted under my care on August 8th, 1870. He had been frequently the subject of both syphilis and gonorrhœa, and for the last fourteen months he had experienced great and increasing difficulty in passing his urine, which is now loaded with mucus and pus. The desire to micturate is very frequent, and he cannot expel more than two tablespoonfuls of urine at a time. He has constant pain over the pubes and at the prostate, and also pain in the glans penis after micturition; and a purulent and bloody discharge exudes from the end of the penis. His aspect is careworn and anxious, and he is very much thinner. His nights are restless, and his general health is materially damaged.

An examination per urethram proved the absence of stricture. A large-sized catheter could be readily passed, but it produced great agony as it entered into the bladder. The examination per anum proved the prostate enlarged, and it was very painful on pressure. An examination of the urine proved the presence of albumen, mucus, pus, and vesical epithelium. presented a white filmy aspect, and was highly ammoniacal. About two ounces and a half of urine were removed by the catheter, and no great quantity of warm water could be injected. A subsequent examination with the sound proved the bladder free from calculus.

case in which the diagnosis was not difficult, but w

The examination with the sound proved

absence of calculus in the bladder. The symptoms did not warrant the conclusion that there was stone in the kidney, for in calculus pyelitis there is usually lumbar pain, increased by exertion, and the penis pain precedes micturition, and is always relieved when the bladder is emptied. In calculus vesicæ, or ulceration of the neck of the bladder, the pain is after micturition, and results from the empty bladder grasping the stone, or approximating the ulcerated surfaces. In this instance, the introduction of an instrument produced intense pain as it passed over the neck of the bladder; and when that viscus was emptied, the suffering was greatly increased, but at once relieved by injecting a small quantity of warm water. As mentioned before, the urine was loaded with pus and mucus; and, to assist the diagnosis, it was necessary to ascertain whether this was secreted by the bladder or kidney. All the urine was, therefore, removed by the catheter, and the bladder was washed out with warm water until the water so injected came away clear. A small quantity of urine was now collected in a test tube, as quickly as it was secreted, and, when examined, only a trace of mucus could be detected; and so far, when taken in connection with the abundant bladder epithelium, tended to prove that the disease was confined to the bladder and prostate. Thus the case was clear; chronic inflammation and temporary contraction of the bladder, with either abscess or ulceration of the vesical aspect of the prostate. There was no reason to believe, either from the history or the aspect of the patient, that the disease was malignant. With such a diagnosis the prognosis was doubtful; but the treatment was clear: absolute rest in the horizontal position, the retention of a soft and perfectly flexible catheter in the bladder, frequent removal of the fetid urine, injections of warm water after the urine was withdrawn, improvement of the general health by suitable medicines, and the use of opiate suppositories to relieve pain. And this was the outline of treatment adopted; and you have now the opportunity of seeing the result. The patient bears no longer an aspect of suffering, he has gained considerable in weight, his appetite is good, his functions properly performed; his bladder will now hold ten ounces of urine, which is perfectly clear, devoid of pus or mucus, and deprived of the epithelium, which escaped so freely before. There is, however, the anticipated drawback. He cannot empty the bladder without the aid of the catheter, and I fear he never will; but this is of little moment compared with his wretched state on admission, for, being now taught to pass his own catheter, he can relieve the bladder at will.

It is not, however, to cases of enlarged prostate and its consequences that the use of the winged catheter should be confined. A very interesting example of retained urine, the result of atony of the bladder, has lately come under my care.

J. M., aged 65, who, excepting for his bladder ailment, was a moderately healthy man, consulted me for what was supposed to be irritable bladder. He stated that, in consequence of the peculiarity of his business, he had for some years habitually retained his urine for a longer period than was desirable. Two years previously to my seeing him he had retention of urine, and since that period he has been compelled to pass water every hour or hour and half. The quantity ejected is very small, highly ammoniacal, and containing both mucus and pus. His health is now impaired, and for the last twelve months he has constantly worn an india-rubber urinal. An examination of his abdomen revealed a distended bladder which was further confirmed by the introduction of a catheter, and the removal of two pints of fetid urine. I requested his surgeon to empty the bladder twice in the twenty-four hours, and decided when his urethra was less sensitive to introduce the self-retaining catheter, so that he might relieve himself at will. Unfortunately, in passing the catheter, his surgeon lacerated the prostate, which occasioned considerable hemorrhage, and subsequent inflammation of the bladder. Rest, opium, and leeches to the perineum having subdued this, the winged catheter was introduced, and the patient was desired to remove the urine *every* four hours, and wash out the bladder with tepid

water night and morning. The character of the urine speedily improved; it lost its ammoniacal fetor, and the mucus and pus gradually diminished. His health was gradually regained, and he is now so far well that he can resume his business. The catheter is removed once in ten days.

Most of you will remember the old man with paralysis of the bladder associated with hemiplegia, who wore one of the winged catheters for a period of five months. In his case the bladder was so small that it would not hold more than six or seven ounces of urine; so that it was necessary (previous to the winged catheter being worn) to draw off the urine six times in twenty-four hours. Being incapable, in consequence of his paralysis, of passing a catheter for himself, he became a great tax on the house-surgeon; but after the winged catheter was inserted, no further trouble was occasioned—the nurse could remove the peg and relieve him without difficulty.

I could multiply these cases both from my hospital and private practice, were it necessary to do so: but I feel that the examples I have related to you are sufficient to show you that in cases of enlarged prostate, and atony or paralysis of the bladder, the winged catheter is of essential service; and in most cases it can be worn with but trifling inconvenience.

I will now relate an interesting case of numerous fistulous openings in the perineum and scrotum that was speedily cured by the retention of the catheter.

An officer in the Indian army, who had long suffered from stricture of the urethra, consulted me in consequence of the serious inconvenience occasioned by the urine escaping from numerous channels in the perineum and scrotum. He had suffered from extravasation of urine, and from abscess; and he was now compelled to sit over a large pan whenever he required to pass his urine. There were two fistulous apertures in the perineum, one in the scrotum, and a fourth in the buttock.

At my first examination I experienced great difficulty in passing a No. 1 catheter. There was a tight stricture in the spongy portion of the urethra, which grasped the instrument with great tenacity. On my next seeing him I passed a No. 1 gum-elastic catheter, which was retained, and in two days I was enabled to introduce the dilator, split the stricture, and pass a No. 9 winged elastic catheter. He suffered very little inconvenience from the operation, and he wore the catheter with ease. The urine now escaped entirely through the catheter, and he could remove it at will. After the lapse of a week it was withdrawn, and found to be slightly coated with phosphates. This was washed off, and the same instrument again inserted. To prevent the redeposit of phosphates he was directed to inject a weak solution of hydrochloric acid twice a day; and when the catheter was again removed it was free from any deposit. This gentleman continued to wear the catheter for a period of four months, when the fistulous openings had entirely healed. The instrument was then removed, and the urine flowed in a good stream. He was taught to pass his own bougie, and has returned to India perfectly well.

I have now related to you four cases as examples of different forms of disease in which the winged india-rubber catheter may be worn with advantage, and I wish particularly to impress upon you the fact, that where a catheter *can be borne* the india-rubber one gives the greatest comfort, and secures to the patient the command of the bladder without the chances of its escaping, and without the necessity of its being fixed by tapes or any other contrivance.

I have used the expression "where it can be borne," because there are many cases where the retention of any instrument excites so much irritation that the patient cannot bear it, and in private I have found this more frequently than in hospital practice. Private patients, as a general rule, will not persevere where pain is occasioned, and they will not consent to remain in bed until the urethra and bladder become accustomed to an instrument. *In hospital* cases the patients are under more control, and you will often *succeed with* them when you cannot do so in private. On the other hand,

there are a certain number of sensitive persons who cannot bear the retention of the catheter under any circumstances, consequently you must not consider this method of treatment as applicable to all. Where any other catheter can be retained there, the india-rubber one is infinitely to be preferred, but where the patient is especially sensitive, some other plan must be adopted.

To estimate the value of this kind of treatment you must inquire into the pathological changes that take place in the genito-urinary apparatus. Retained urine not only produces enlargement of the bladder and distension of the ureters and pelvis of the kidney, but disease of the kidney itself, and it is only when the bladder is enormously distended with urine that it can be acted upon by the pressure of the abdominal muscles, the contraction of which squeezes out a small quantity of urine, which gives relief for the time. But in cases where the bladder is hypertrophied and contracted, the patient suffers from absolute retention; the bladder has no power to contract, and no muscular force of the abdominal walls can assist it; and when we recollect that in addition to this, retained urine produces chronic inflammation of the bladder, resulting in not only decomposition of the urine, but a large secretion of mucus and pus, with shedding of bladder epithelium, we cannot be surprised at the fatality of such cases. The patient in very many instances not only endures extreme suffering, but he is continually poisoned by the absorption of the perverted urine, and gradually and surely dies.

I have hitherto only spoken of the mechanical means by which good can be effected; but, although it must be admitted that, in the main, mechanical means must be resorted to, yet great assistance is frequently obtained by the judicious administration of certain drugs. Copaiba is frequently very serviceable. Hydrochloric acid and opium may be prescribed with advantage. Quinine, where the health is failing, is especially valuable. But, whatever adjunct you may choose, nothing will supersede the removal of the urine and washing out the bladder with tepid water. I have occasionally used weak hydrochloric acid, or highly diluted carbolic acid; I cannot, however, say that I have ever seen any decided advantage from either, and I believe warm water is better than anything else.

The catheter is made of india-rubber, with wings to prevent its escape from the bladder, and is similar to that of which there was an engraving in the Lancet some months since. It has the advantage of being self-retaining, and is indestructible; and it may be worn for any time without removal, provided it remains free from phosphatic deposit. To determine the special tendency to this, I always advise that the catheter should be removed at intervals, at first of four or five days, the intervals being gradually increased in accordance with the tendency to deposit; for while in some cases it may be worn for a month without any accumulation on its end, in another phosphates may be detected after the expiration of a few days. This rule should not under any circumstances be departed from.

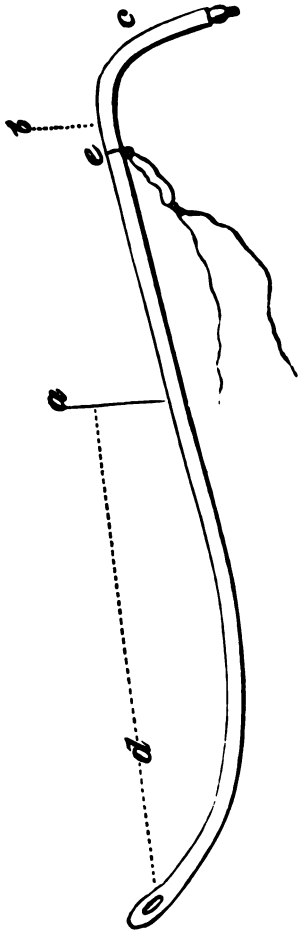
In order to prevent this accumulation, I have latterly used the catheter with the addition of a highly polished silver cap, which not only facilitates its introduction, but certainly prevents phosphatic deposit in anything like the time that it will become affixed to the india-rubber. Mr. Baker is now making these caps, which will before long be ready for use,—*Lancet*, *Dec.* 17, 1870, *p.* 843.

57.—ON AN IMPROVED VULCANISED INDIA-RUBBER CATHETER, FOR RETAINING WITHIN THE BLADDER.

By Sir Henry Thompson, Surgeon-Extraordinary to H.M. the King of the Belgians; Professor of Clinical Surgery and Surgeon to University College Hospital.

For many years I have used the vulcanised india-rubber catheter for tying in the urethra and bladder, and have found it, as many others have done, extremely valuable from its perfect flexibility, and the consequent small

liability to excite irritation which its presence produces. In most cases it is easily kept in place by a loop of soft twine, loosely tied round the penis, just behind the glans; but in a few instances this very quality of flexibility, which is so advantageous, permits the escape of the instrument from the canal, and difficulty is experienced in efficiently retaining it there. Hence Mr. Holt's suggestion of "wings" to the end of the instrument which lies within the bladder. Efficient as these may be when *in situ*, although they unquestionably sometimes occasion irritation, an instrument so furnished does by no means always pass easily, and usually causes more uneasiness, both in the act of passing and afterwards, than a catheter not furnished with such appendages.



Improved vulcanised India-rubber catheter.—*a* to *b* shows the length of the German-silver tube which at this part lines the tube and stiffens it. *c*. Anterior portion of catheter, which remains flexible, and conducts away the urine; a peg is fitted into it. *d*. Posterior portion of catheter, which remains flexible, and rests in the urethra and bladder. *e*. A piece of stout silk, the free ends of which, lightly tied behind the glans penis, secure the catheter in its place.

The problem, then, is to efficiently maintain the soft vulcanised catheter in place without making additions of this kind. This I have accomplished, I believe completely and successfully in the manner following:—Into an ordinary vulcanised india-rubber catheter, say about the size of 8, 9, or 10, or more, according to the requirements of the case, a thin German-silver tube, about four or five inches long, is introduced by the maker, so that the last six inches of the catheter remain as flexible as ever, also about two inches of the anterior part, to form a spout or conductor outwards for the urine. This being done, the calibre of the interior is still nearly uniform,—the thinness of the metal tube and the elasticity of the india-rubber being so accommodated to each other as to accomplish this object. This description has been practically realised for me by Messrs. Weiss, the well-known instrument makers. (See figure.) The instrument is furnished with a silk cord to fasten it, which, owing to the metal-tube, cannot diminish the choke or diameter.

The advantages of this catheter are several :—

First, not only is it not more difficult to pass, but less so than the original instrument without wings, since the metal tube affords a handle which almost invariably carries the flexible part beyond it easily into the bladder.

Secondly, when the loop of silk with which the catheter is provided is loosely tied behind the glans, it is next to impossible for the instrument to escape; the want of flexibility in the silvered part securing this. In special cases in which it is desired, the silver may be shortened to two or three inches with perfect security.

Lastly, since no appendage exists in that part of the catheter which is within the bladder, the liability to retain any phosphatic deposit is reduced *to a minimum*, and no special attention to remove such foreign matter is *always* necessary. In one instance I kept it in six weeks without the

slightest incrustation occurring. It is, however, as a rule prudent to remove the catheter every few days to observe if any takes place, and this is a matter of no consequence, as no difficulty or pain arises from its reintroduction.—*Lancet, Feb.* 11, 1871, *p.* 185.

58.—ON THE TREATMENT OF INCONTINENCE OF URINE.

By Dr. WILLIAM THOMSON, Peterborough.

Six months ago a patient informed me that her daughter, aged twelve, suffered from this complaint, but supposed medicine would not do her any good, as she had suffered from it for two years. She looked healthy, not at all anæmic, appetite good; in fact, enjoyed perfect health, with the exception of the frequent desire to pass water, and the inability to retain it during sleep. As I was anxious to show my patient that medicine would do good, I thought chloral hydrate likely to have the desired effect, at least in checking the nocturnal symptoms. I ordered her fifteen grains every night on going to bed, to fast from 7 o'clock till next morning, and to eschew beer and spirits. I did not see her for two days; when her mother informed me she was cured. The very first night she rested well, and did not get up once, instead of four or five times as formerly, besides wetting the bed nightly. She still had the desire to go frequently in the day time. I ordered her, therefore, to continue the medicine for a fortnight, decreasing the dose to ten grains, which she then discontinued entirely, and was perfectly well when I saw her last week.

I felt delighted with the success of the chloral in this case, but waited anxiously for further trial, which, I am happy to say, came soon afterwards. I was applied to for a boy aged thirteen, who had nocturnal incontinence since he was six years old; but not the day symptoms. I gave him fifteen grains of chloral at bed time. He slept well till five in the morning without his usual misfortune. At the end of a week I advised him to have some more medicine; but he said he thought he did not require it, as last night he omitted to take his dose, and all was well this morning. Continued the medicine a week longer,—i.e., three weeks ago. Since then he has remained quite well.

Now, here is a remedy most simple in its action, without any of the unpleasant effects of belladonna on the vision, &c. Where the case is merely one of habit, as both the above, we could hardly expect a more simple and efficient remedy than chloral, which, by its ensuring the bladder and sphincter vesicæ a quiet night's rest, enables them in a few days to regain their normal tone, and the patient his wonted vigour, so that he may retire to rest without his former dread of a disturbed night, or of awakening in the morning to find he is a defaulter to the laws of cleanliness and health.—*Lancet, Nov.* 19, 1870, *p.* 703.

59.—ON THE FUNCTION OF THE PROSTATE GLAND.

By Dr. KRAUS, Editor of the *Vienna Medical Times.*

I believe that I have discovered some essential points relating to the function of the prostate; but I will at present only make some preliminary statements that I think will be found to deserve attention.

1. The seminal fluid, as long as it remains within the testes, vesicles, and other seminal passages, is colourless and scentless, being in appearance exactly like fresh honey while deposited in the comb; and in its reactions it is neutral.

2. Only when it has quitted the passages and arrived in the urethra does it acquire its white color and its peculiar faint smell.

3. During its passage through the prostatic portion of the urethra, the prostate empties out its fluid, colors the semen white, and confers upon it

the faculty of coagulating when exposed to the air (alkaline reaction). Semen taken from the seminal vesicles does not coagulate, but remains clear, colourless, and scentless.

4. The spermatozoa, in the absence of the prostatic fluid, cannot live in mucous membrane of the uterus of mammalia; but with its aid they may live for a long time in the uterine mucus, often more than thirty-six hours.

I have conducted these experiments with the greatest care, and recommend their repetition, in order that the truth of my positions may be ascertained. From the above, the conclusion may be drawn that the prostatic fluid exercises an unlimited influence on the viability of the spermatozoa, sustaining it when endangered by the mucus secreted by the mucous membrane of the uterus.

This is undoubtedly the case with those species of animals, which possess a prostate, and I intend next to extend my investigations to those species which are destitute of this.—*Medical Times and Gazette, Feb.* 11, 1871, *p.* 170.

60.—CONTRIBUTIONS TO THE PATHOLOGY OF THE PROSTATE GLAND.

By Dr. Kraus.

It may now be laid down as a rule, admitting of but few exceptions, that all diseases of the prostate take their origin in catarrh of the urethra or bladder. Also, the diseases of the seminiferous organs must, without exception, be referred to blenorrhagia of the urethra; so that, in future, what have been considered as sympathetic affections of the vesiculæ, the vasa deferentia, and the epididymis must be regarded as an extension of the blenorrhagic inflammation of the urethra. The fifteen or sixteen of the prostatic ducts, too, which open near the caput gallinaginis are affected with this catarrh when the blenorrhagia extends to the prostatic portion of the urethra. In consequence of the entrance of large quantities of the catarrhal secretion, the gland becomes greatly swollen and enlarged. It would, indeed, be remarkable if these ducts, the office of which it is to discharge the prostatic fluid, should not participate in the general catarrhal process. The enlargement of the prostate about the twenty-fifth or twenty-sixth day of the blenorrhagia is solely attributable to the blenorrhagic affection of its ducts. The considerable muscular elements which the prostate contains is kept, by means of the catarrhal irritation, in a state of constant contraction, inducing increased excretion from its ducts, and contributing to that large discharge from the urethra which is observed when the prostatic portion of this canal participates in the blenorrhagic process. I have exhibited the truth of this statement by injecting blenorrhagic matter into the prostatic portions of the urethras of five dogs, and finding, on making a section of the prostate twenty-four days afterwards, that it was loaded with secretion. Of the blenorrhagic inflammation of the prostatic ducts, and consequent enlargement of the prostate, there can be, then, no doubt. Even in catarrhal affection of the urethra, which to the observer does not seem to involve the prostatic portion, the prostate may still be swollen. This frequently occurs, too, in chronic catarrh of the bladder, when some of the secretion expelled from the bladder, and detained in the prostatic portion of the urethra, excites inflammatory action in the prostatic ducts. I possess two preparations in which the dendritic ramifications of indurated catarrhal secretion, like that observed in the bronchi in croup, are seen within the canals of the prostate. These preparations confirm the observations that I had already made, that in catarrh of the bladder, owing to the loss of tone in the organ, the secretion becomes arrested in the prostatic portion of the urethra, and, subjected to pressure there, is forced into the ducts. The cavity of the caput gallinaginis also becomes filled with the secretion, and from thence the *catarrhal inflammation* spreads along the ejaculatory ducts to the vesiculæ *and epididymis*.

I have, in a former work, shown, by exact observation, that in several cases the copulative power becomes lost through the agglutination or entire adhesion of the ejaculatory ducts. These observations have been corroborated during the present investigations on the condition of the prostate. In eight of the preparations of catarrhal affections of the bladder, the ducts of the prostate were found loaded and impermeable, and in two the vasa deferentia were adherent. The so-called bloody semen is a fiction, for neither in the vesiculæ or the other seminal passages have I ever met with it. It is only rendered bloody when, in blenorrhagia or vesical catarrh, the semen is forcibly expelled through the adherent ducts. The patients, especially young persons, are enabled to indicate the point of rupture if they indulge in coitus during the blenorrhagia. There are two possible cases—either the advancing column of semen has power enough to burst through the adhesion of the ducts, and then bloody semen results; or, when it is deficient in this, the patient is aware of the sense of regurgitation, and the semen, remaining awhile in the passages, is soon forced backwards. These conditions may be observed by those who examine the subject with the necessary care.

The tumefaction of the prostate may be only a temporary symptom, disappearing with the blenorrhagia or the vesical catarrh. When, however, there is persistent obstruction or adhesion of its ducts, as my former investigations have shown that the discharge of the prostatic fluid is an indispensable condition of the exercise of the generative faculty, we have to consider carefully the condition of the prostate and its ducts as well as that of the seminal passages. For having demonstrrated the blenorrhagic affection of the prostatic ducts we claim entire priority, notwithstanding any accidental recognition of similar results by former authors. We have in former investigations shown that the prostate is to be regarded as no mere accessory organ, but as a *sine qua non* of the entire generative apparatus, complete generation being impossible in an abnormal condition of this organ. The prostatic fluid must, in its chemical and other conditions, be in a pure state in order that generation may be accomplished. But in blenorrhagia which has extended into its ducts, this function becomes impeded, for the quality of the prostatic secretion often undergoes alteration for a long period; so that persons affected with blenorrhagia of the prostatic ducts and their secreting elements are incapable of generation because the prostatic fluid is in an abnormal condition.

The diagnosis of blenorrhagia of the prostatic ducts is very difficult as regards specially characteristic symptoms, although the participation of the prostate in the diseased conditions of the urethra and bladder can be made out in a somewhat undefined manner. Neither any considerable amount of pain nor enlargement of the lobes of the organ, except of the posterior in an advanced stage of the affection, furnish indications of the blenorrhagic affection of the organ. From the twentieth to the twenty-fifth day of its duration the attentive observer may, however, have an opportunity of observing a change in the colour and consistence of the secretion. The whitish mucus may all at once assume a greenish-yellow colour, and be greatly augmented by pressure on the root of the penis. A prickling sensation in the rectum indicates an abnormal condition of the posterior lobe, without determining the nature of this. An important sign that the prostatic portion of the urethra is affected in vesical catarrh is the difficulty with which a catheter is passed into the bladder. This, which otherwise can be passed in with ease, also now induces severe pain while traversing the prostatic portion, even when the blenorrhagia is in its chronic stage. The lancinating pains shooting down to the testes, and the pains in general which irradiate more or less over the whole genito-urinary apparatus in its inflamed condition, have nothing special about them in this affection. In the dead body, when the prostatic ducts have participated in the blenorrhagia, the whole prostatic portion of the urethra is found intensely injected; and on pressure being made upon the prostate, true blenorrhagic secretion is discharged from the ducts. It is of great interest, too, to note that even when the blenorrhagia has entirely ceased in the urethra, it may still persist.

in the prostate. We have two beautiful preparations, in which, while the urethra is entirely free from blenorrhagia, the ducts of the prostate, and even the acini, as shown by the microscope, are loaded with blenorrhagic secretion. The secretion was so abundant that on pressure being made it issued abundantly. We had occasion to observe this in a remarkable manner in a patient dying of typhus. Along the entire urethra, no trace of blenorrhagia of recent origin was observable; but the trigonum, the caput gallinaginis, and inner orifice of the urethra were in a condition characteristic of this affection of the prostate—viz., hyperæmic, with small erosions, and swollen.

Some authors who do not pay sufficient attention to the anatomical conditions, and seem not to be aware that the prostate is both in front and behind encapsulated in a very tense membrane, describe abscesses which, forming on the surface of the gland, penetrate into its cavity. In the innumerable cases of diseases of the prostate and bladder which we have hitherto examined, we have never met with such abscesses, except where an unskilful operator has perforated the gland with his catheter. The muscular tissue is so prevalent in its texture, that the formation of abscess in its substance must be a very rare occurrence, seeing how frequent are abscesses of muscle. Isolated by means of ligaments and tendons and its own strong fibrous covering, the prostate does not participate in the diseased condition of surrounding organs, and, with the exception of the parotid gland, there is no organ which so well preserves such independent condition.

On slitting up the prostatic ducts affected by blenorrhagia, they are found to be dilated to three or four times their natural size. In their normal condition there are only five or six of the sixteen ducts that will admit even a fine bristle, the calibre of the others only being ascertainable by the microscope ; and their dilatation is entirely due to the presence of so large a quantity of secretion, during the blenorrhagia of the prostatic portion. Not only do they become larger, but also longer, some of the ducts, which in the normal condition are scarcely a line in length, becoming two or two and a half lines long. A slate-coloured coloration surrounding the mouths of the ducts is characteristic of their condition, and not only are the ducts pigmented in a similar manner, but they exhibited a slate-coloured deposit, which, under the microscope, is shown to contain crystals of triple phosphate. This coloration is to be distinguished from a post-mortem appearance, and from one which may be artificially produced by passing the knife over the mucous membrane. In the pathological condition, there is a deep blue colour around the mouths of the ducts, disposed in circular stripes, while the post-mortem appearance is diffused without any streaking. In the pathological process there is also a slate-coloured deposit, which is never absent in the *trigonum Lieutaudi.*

After chronic catarrh of the bladder, the careful examination of the prostatic portion of the urethra should never be omitted. Small erosions at the inner end of the urethra should serve as an indication that the prostate may be involved, and lead to its examination. This will, sooner or later, lead to the pathology of the prostate entering upon a new phase. As we have already shown, too, the catarrhal secretion expelled from the bladder may, by the continuous pressure it exerts on the prostatic portion of the urethra, give rise to dilatation of the prostatic ducts and the forcing of the discharge into these, in this way leading to the propagation of the catarrhal condition of the bladder to the prostate. In such cases, we find exactly the same secretion, which is accumulated at the base of the bladder; and it is the near resemblance which this often has to pus which has led some authors to mistake it for suppuration of the prostate. The great difficulty which exists in distinguishing this secretion from pus, leads to the suspicion that suppuration of the prostate is commencing; but if all the cases presenting secretion having this appearance were actually of the dangerous character attributed to them, even by the most recent pathologists, we should have to pronounce a fatal prognosis in one half of the cases in vesical catarrh. In most cases of this affection, after a time, pus is found in the

secretion without the condition of the patient undergoing any essential change. This presents us with an unwelcome example of how little the histological investigations concerning the innocent or malignant nature of cells have advanced our science: for nowhere more than with respect to the secretions of the diseased urethra can the worthlessness of the hitherto current theories on the mischievous effects of pus be better shown.

The posterior portions of the prostate, on account of their more intimate connexion with the urethra, participate more readily in its affections, and during the inflammatory stage of prostatic blenorrhagia, these lobes may undergo a considerable increase in size without this being perceptible during life. After death, one or other of the lobes may be seen to have undergone very considerable increase without producing any stricture in the rectum, this being rather dislocated than obstructed by its increase. The examination of the prostate frequently gives rise to deception, for the gland must have increased three or four times in size before it can be reached by the finger, and a lesser amount of enlargement cannot therefore be diagnosticated. An increase of the gland, such as can be ascertained per anum, can only arise from a degeneration of its entire posterior lobe; and at present we have only to do with the blenorrhagic affections of the prostate. The tensity of its capsule prevents any very great enlargement, but sometimes a portion of the glandular substances perforates this, and projects in the form of a process into the rectum. The same condition may ensue from a mechanical injury done to the gland while passing a catheter.

Strictures of the urethra from enlargement of the prostate are of extreme rarity, notwithstanding that this is regarded as a frequent cause. The urethra has so large a play between the corpora cavernosa, and can exert much locomotion before being interfered with by an enlargement of the prostate.—*Medical Times and Gazette, March* 11, 1871, *p.* 271.

AFFECTIONS OF THE EYE AND EAR.

61.—ON THE OPHTHALMOSCOPIC EXAMINATION OF HEALTHY EYES.

By J. Soelberg Wells, Esq., Ophthalmic Surgeon to King's College Hospital.

In examining an eye with the opthalmoscope, it is generally necessary to have a dark room* and a bright, steadily-burning oil or gas lamp. The best gas lamp is that employed at Moorfields, which has an Argand porcelain burner perforated by small apertures, and closed underneath by fine wire gauze, which regulates the draught and steadies the flame. It is attached to a movable arm permitting of universal movement in all directions. The burner is to be covered only by a chimney, without a globe. In place of gas, an oil or paraffin lamp may be employed.

In the selection of a portable monocular ophthalmoscope, I think our choice lies between the instruments of Liebreich and Coccius. The former consists of a concave metal mirror of eight inches' focal length, having a small central aperture; behind the mirror is a clip to hold a convex or concave lens. In Coccius's instrument the mirror is plane, and there is a biconvex lateral lens of five or seven inches focus held in a clip and mounted on a jointed bracket. It is to be used in the following manner:—The lateral collecting lens is to be turned towards the flame, which should be somewhat more than twice the focal length of the lens from the observer. The mirror is then to be set somewhat slantingly to the laterel lens and the eye of the patient. If the mirror is properly adjusted, we shall obtain, if we throw the reflection on the palm of our hand or the cheek of the patient, a bright circle of light, with a small dark central spot, which corresponds to the opening in the speculum. Liebreich's is an excellent instrument, and, as it

* Dr. Lionel Beale has lately invented an ingenious ophthalmoscope which may be used by daylight.

is somewhat easier to use, is more generally employed; but I rather prefer that of Coccius, chiefly for the following reasons: the lateral lens enables us to alter the focal length of the mirror and the intensity of the illumination. Moreover, the reflection is much less, which is of much importance when we examine eyes whose pupils are very small.

In making an ophthalmoscopic examination, the surgeon seats himself directly in front of the patient, at a distance of from 14 in. to 18 in. He then places the mirror, held in his right hand, close to his eye, and turns it slightly towards the flame; so that the rays from the latter may be reflected into the eye of the patient, whose pupil will then be brightly illuminated, and present a brilliant red glow. The surgeon may now avail himself of one of two methods of examining the details of the background of the eye —viz., the direct or the indirect mode of examination. With the former he obtains an erect image of the fundus; whilst with the indirect the image is reversed. He should be equally well versed in both modes of investigation, to the explanation of which we must now pass on.

The examination of the actual inverted image, or indirect method.—The pupil having been well illuminated with the mirror, the patient should be told to look somewhat to the left (if his right eye is under examination), at the surgeon's right ear, and *vice versâ*. In this way the optic disc, which is situated to the inner side of the optic axis, is brought directly opposite the surgeon's eye. The latter will now at once notice that the reflex is no longer bright red, but of a whitish-yellow tint. When this change of color is obtained, the surgeon should take the rim of a biconvex lens (termed the object-lens), of 2 in. or 2½ in. focus, between the forefinger and thumb of his left hand, and hold it 2 in. or 2½ in. from the eye under observation, his ring-finger being placed against the upper edge of the orbit, so as to steady the hand; the upper lid may, if necessary, be at the same time lifted with the tip of this or the little finger. With a little practice and perseverance the surgeon will soon succeed in obtaining an inverted aerial and enlarged image of the optic disc, which will be situated between the observer and the object-lens, and at about the focal distance of the latter. This varies, however, with the refraction of the patient's eye. In order to magnify the image still more, an object-lens, of 3 in. or 4 in. focus, may be employed, or a convex ocular lens of 8 in. or 10 in. focus, may be placed in the clip behind the mirror.

The examination of the virtual erect image (direct method).—In this the mirror alone is used without the object-lens; and the surgeon must approach his eye very close to that of the patient, if he wishes to distinguish the details of the fundus, of which he gains a much larger image. Hence this mode of investigation is very useful in solving doubts (which may exist in the indirect method) as to the exact nature and situation of some morbid appearances. Generally a concave ocular lens will be required in order to gain a clear image of the details of the fundus. This will, however, depend upon the state of refraction of the patient's and surgeon's eye. The novice should have the patient's pupil dilated with a very weak solution of atropine, as this greatly facilitates the examination. But when the surgeon has acquired some dexterity, he must accustom himself to examine with the pupil undilated; for the atropine causes the patient much annoyance and inconvenience, and should therefore only be employed in exceptional cases.

The ophthalmoscopic appearances of healthy eyes.—The examination of the normal refracting media of the eye (cornea, lens, and vitreous humour) affords a negative result. It must, however, be remembered that the lens undergoes certain physiological changes with advancing years, which a careless observer might mistake for commencing cataract; for the lens substance becomes consolidated, and its nucleus assumes a yellow tint, which is especially marked by reflecting light (oblique illumination), but on examining it in the erect image the lens will be found quite transparent.

The optic disc or papilla (entrance of the optic nerve) appears as a cir-

cular pinkish-white disc; being lighter and more glistening in dark eyes than in those of persons of fair complexion. It is sometimes oval, this being especially marked in astigmatism. Its outline is sharply defined, and on closer examination we can distinguish at its margin three boundaries or zones: 1, the inner, grey, nerve boundary; 2, the white sclerotic ring, which is most evident at the outer side; 3, external to this, the dark-grey line of the choroidal ring, which is somewhat irregular in shape, and often fringed here and there with deposits of pigment.

The internal half of the disc is redder than the external, which has a somewhat mottled, greyish-white appearance; the grey stippling being due to the nerve-tubules, which are seen in the section, the white dots or lines being caused by the trabeculæ of the connective tissue. It is important to remember this physiological difference in the color of the inner and outer portion of the disc, for inattention to this fact may lead to an error in diagnosis; the normal redness of the inner half being perhaps mistaken for hyperæmia or inflammation of the nerve, or the whiteness of the outer portion for incipient atrophy.

The retinal vessels generally issue from or near the central portion of the disc, and their number, mode of division, and course vary considerably. The principal branches, however, always run upwards and downwards; as a rule, an artery and two veins pass upwards, and the same number downwards, but sometimes there are two arteries and two veins. Whilst numerous but small vessels run towards the inner side, only a very few minute twigs are sent to the outer. The retinal arteries may be distinguished from the veins by the fact that they are lighter, smaller, and straighter in their course, having often also a bright streak along their centre, which is due to the reflection of light from the cylindrical walls of the vessels. The blood-supply of the most anterior part of the optic nerve is maintained by three sets of vessels—1, by small twigs from the central vessels of the retina; 2, by branches emanating from a vascular circle situated close to the margin of the optic nerve, and formed by some of the short posterior ciliary arteries; 3, Leber has found that numerous arteries and some veins pass directly from the choroid to the optic nerve, so that the chorio-capillary system is directly continuous with the delicate net-work of vessels which surrounds the bundles of the nerve fibres. This anastomosis explains why there is so often a hyperæmic condition of the optic disc in inflammatory affections of the choroid.

Two physiological peculiarities are frequently observed in the optic disc—viz., spontaneous, or very easily producible, pulsation of the retinal veins, and physiological excavation of the optic nerve. 1. The venous pulsation is almost always confined to the disc, and is characterised by an alternate increase and diminution in the calibre of the vein; the emptying commencing at the centre of the disc and extending to the periphery, whereas the filling is centripetal. Slight pressure on the eyeball with the tip of the finger renders the pulsation more marked. Whilst spontaneous venous pulsation is quite physiological, it must be remembered that it is otherwise with spontaneous pulsation of the retinal arteries, for this is always a pathological phenomenon, depending on an abnormal increase in the intraocular tension. 2. The physiological excavation may be at once recognised by its being limited more or less to the centre of the disc, and not extending to its margin. A white, glistening, oval or round spot is noticed at or near the centre of the disc, surrounded by a reddish zone, which varies in breadth with the size of the excavation; if the latter is small, the zone will be wide, and *vice versâ*. The edge of the white spot (excavation) generally slopes gently, and is only steep or abrupt if the cup is funnel-shaped. If we trace the course of the retinal vessels from the periphery of the disc towards the centre, we find that they describe a more or less acute curve as they pass down over the margin of the excavation. This curve is, of course, the more abrupt and considerable the deeper the cup.

Leaving the optic disc, the beginner must next attentively study the general appearances of the back ground of the eye (fundus oculi); and observe

the mode and distribution of the retinal vessels, and the difference between these and those of the choroid. The bright-red colour of the fundus is due to the reflection of the light from the bloodvessels of the retina and choroid, more especially the latter, and not at all to the retina itself; for as the latter is very translucent, it reflects but very little light, and is quite invisible in the eyes of very fair persons. In very dark eyes it appears as a thin grey film or veil spread over the fundus, being especially apparent around the disc and yellow spot.

The great variations in the appearances of the fundus which are observed in persons of different complexions should also be attentively studied. In dark individuals the fundus appears of a rich reddish-brown tint; and if the epithelial layer and the stroma of the choroid are rich in pigment, the choroidal vessels may be completely hidden, and only the retinal vessels be apparent, dividing and subdividing into numerous branches, which become smaller and smaller towards the periphery. If the epithelial layer contains but little pigment, but the stroma is richly pigmented, the appearances will be totally different; for then the choroidal vessels will be distinctly visible, appearing as bright-red bands or ribbons divided by dark islets or intervals, the intervascular spaces. If the stroma is light, the epithelial cells appear, with a high magnifying power, as small, circumscribed dots, uniformly strewn about the fundus, and giving the latter a granulated appearance. In the eyes of very fair persons (*e.g.*, albinos), the fundus is of a pale-red tint, and the choroidal vessels present a very striking appearance, being visible to their smallest divisions.

The examination of the yellow spot (macula lutea) generally affords a negative result; but in those cases in which it can be seen, it will be found that in dark eyes it appears as a largish dark-red spot with a small white dot in the centre, the foramen centrale. In light eyes it has a bright-red tint, the foramen centrale resembling a small light circle. The retinal vessels course round in the yellow spot, sending a few twigs towards it, but leaving its centre free.

The beginner should always proceed on a certain system in his ophthalmoscopic examination, for by doing this he will be guarded against overlooking anything. He should therefore examine every eye in the following manner:—First, with the oblique illumination; secondly, in the erect image; thirdly, in the reverse image.

The examination with the oblique illumination is of great use in ascertaining the condition of the more superficial parts of the eye—*i.e.*, the cornea, iris, pupil and crystalline lens, and even the anterior portion of the vitreous humour. It is to be thus conducted :—A lamp having been placed somewhat in front and to one side of the patient, at a distance of from two to two and a half feet, and on a level with his eye, the light is to be concentrated upon the cornea, iris, or crystalline lens, by a strong convex lens of two or three inches focus. The observer's eye is to be placed on one side of the patient so as to catch the rays reflected from the eye of the latter. To enlarge the image the surgeon may employ a second lens as a magnifying glass.

When the examination with the oblique illumination is finished, the surgeon must examine the refracting media in the erect image, and also ascertain the state of refraction. In this proceeding the mirror alone is used, the surgeon placing himself at a distance of ten or twelve inches from the patient. The latter should be told to look in various directions, in order that the more peripheral portions of the lens may come into view and any marginal opacities be detected. Moreover, these movements cause any vitreous opacities to be shaken up and to float through the field of vision. Next as to the refraction; if there is a high degree of myopia or hypermetropia, this condition may be readily detected by the fact that we can see the details of the fundus—*e.g.*, the retinal vessels, at some distance in the erect image. For instance, if, in a case of high myopia, we regard one of the retinal vessels on the disc or retina, and move our head slightly to one side, we notice that the image moves in the contrary direction; if

we move to the right, it moves to the left, and *vice versâ;* so that we obtain a reverse image of the fundus. In hypermetropia, on the other hand, just the opposite occurs, for the image moves in the same direction as the observer. In emmetropia we do not with the direct method gain any image of the fundus at some distance, which is in part due to the great diminution of the visual field, but chiefly to the rapidly increasing enlargement of the object when the eye is examined at a distance, which is so great that in the area of the field no single vessel can be seen sharply defined, but only appears as a red reflection in the pupil. Mr. Couper has lately shown that with a weak concave mirror (of thirty inches focus) cases of mixed astigmatism may be easily diagnosed in the erect image ; in such cases an inverted or erect image becomes alternately visible according as the observer views the fundus through the meridian of the greatest or the least curvature. The state of refraction may also be diagnosed in the reverse image. In the *emmetropic* eye the reversed enlarged image of its fundus is formed in front of the object lens, and at its focal distance. In *hypermetropia* the emerging rays are divergent, and hence the image is formed further off than the focal distance, and is consequently larger than in emmetropia. In *myopia* the emerging rays are convergent; the image is therefore formed nearer than the focal distance, and is consequently smaller. Mr. Hutchinson has, moreover, pointed out that the existence of hypermetropia or myopia may also be recognised in the reverse image by observing whether the size of the disc undergoes any change when the object lens is removed further from the eye; for in hypermetropia it diminishes and in myopia it increases in size as the lens is removed to a greater distance.

I cannot too strongly impress upon beginners the importance of closely and minutely examining a great number of healthy eyes, so that they may become thoroughly conversant with the physiological appearances of the fundus, and the numerous peculiarities that may occur within normal limits. To those who have not the opportunity of examining many human eyes, I would recommend the use of Perrin's artificial eye. It consists of a brass artificial eye, fitted in front with a plano-convex lens, in the situation of the cornea. This lens is covered with a black metal cap, having a central aperture corresponding to the pupil. There are two of these caps; the one has a very small central aperture, which corresponds to the normal size of the pupil; the other a larger opening, like a widely-dilated pupil. There are, also, three lenses of different refracting power, thus enabling us to convert the eye into a hypermetropic, myopic, or astigmatic one. The posterior half of the eye opens, so as to admit of the insertion of a papier-maché cup or disc, coloured so as to represent the appearances of the healthy fundus, or of some pathological condition. There is a series of these coloured discs, illustrating many of the morbid ophthalmoscopic changes of the fundus.

[Before commencing any ophthalmoscopic examination of the fundus oculi, it is always necessary to examine the condition of the refracting media, both with the oblique illumination and in the erect image. In examining the lens or vitreous humour, it will be advisable for the beginner to have the patient's pupil widely dilated with atropine.]

With the oblique illumination opacities in the refracting media will appear in their true colours; opacities of the lens, for instance, look like grey or white lines or patches on a dark background; whereas in the erect image they will appear as dark spots on a red background, for, as their surfaces reflect but little light, they will be seen in shadow. There is no difficulty in judging of the exact position if the opacity is situated in the cornea, the capsule, or the lens. But in the vitreous humour it is less easy to estimate the depth at which it is placed. This is best decided in the following manner :—The observer, employing the erect image, should look straight into the eye, so that his visual line passes through the turning-point of the patient's eye (which corresponds nearly to the posterior pole of the crystalline lens). Now if the eye under observation is moved about in different directions, the turning-point and the corneal reflection will alone remain stationary. *Hence any opacity* situated exactly at the turning-point will

remain immoveable; whereas if it is situated in front of this point it will move in the same direction as the cornea; if behind it in a direction opposite to that of the cornea. The further the opacity lies from the cornea, the greater will this movement be. If the object lies deep in the vitreous, just in front of the retina, the surgeon should examine the eye in the reverse image, and on slightly moving the object-lens from side to side he will notice that the further the object is from the retina, the more marked will be its movement in the same direction as that of the lens.

The cornea is best examined with the oblique illumination, especially for determining the exact situation, size and nature of foreign bodies, ulcers, or opacities. A second lens, or even a microscope, may be used for the purpose of magnifying.

Conical cornea may easily be recognised without any aid, if it be considerable in degree; for, on looking at it from the front, the centre of the cornea will appear unusually glistening and bright, as if a little tear-drop were suspended from it. The shape and size of the conicity become still more apparent on regarding the cornea in profile; but in the erect image even slight degrees of the affection may be at once detected. For on illuminating the cone we receive a red reflection from the apex, which gradually becomes shaded off and darker towards the base; so that the central bright spot is surrounded by a dark zone, which is again encircled by a red ring. If we throw the light at different angles on the centre of the cone, that side of it which is opposite to the light will be darkened. On examining the fundus in the reverse image, a considerable parallax is noticed; for on moving the object-lens to and fro, certain portions of the disc and of the vessels upon it will be displaced and distorted, whilst others remain unchanged.

The anterior chamber and iris.—Deposits of lymph, effusions of blood, or foreign bodies in the anterior chamber are best seen with the oblique illumination. The same is the case with morbid changes in the tissue of the iris, or deposits of lymph at the edge or into the area of the pupil. Whereas the examination in the erect image will be found very useful in detecting any gaps in the iris, or any detachment of the latter from its ciliary insertion; for in such cases we shall obtain through the gap a bright-red reflex from the fundus, it being taken for granted of course that the media behind are transparent.

The crystalline lens.—A fully-formed, mature cataract is readily distinguished with the naked eye as a whitish, opalescent body in the area of the pupil; but it is different with incipient cataract, especially if it be but slight in degree and confined to the margin of the lens. Both the soft and hard variety of cataract generally commence at the periphery. In *incipient cortical* (soft) *cataract* we notice in the erect image, dark, well defined stripes intersecting the red fundus, and radiating from the periphery to the centre; between them there are generally smaller stunted stripes, or little opaque patches. The interjacent lens-substance is at first transparent, but gradually the cloudiness becomes more general and diffuse. With the oblique illumination the opacities assume a greyish-white tint, the stripes being broad, white, and often opalescent; but there is no yellow reflex, and this is of importance, as proving the absence of a more or less hard nucleus. In *fluid cataract* the opacity is homogeneous, of a milky-white or dirty gray color, and reaches quite up to the anterior capsule; and there are no opalescent stripes. The *nuclear or hard senile cataract* is met with after the age of thirty-five or forty, and as a rule, also begins at the margin in the form of small narrow stripes and spots; the opacity gradually increases and assumes towards the centre a yellowish colour, which indicates the presence of a hardish nucleus. The larger the area yielding this tint, and the darker the colour, the larger and harder is the nucleus. If the opacity commences at the posterior pole of the lens, the general condition of the eye must be carefully examined *viz.*, the sight, the field of vision, the eye-tension, and the ophthalmoscopic appearances of the fundus, if the latter be still visible, for this form of cataract (posterior polar cataract) not unfrequently occurs in the later stages of certain affections of the choroid and retina.

Lamellar cataract.—It is very important, in a practical point of view to recognise this form, as it is often best treated by the formation of an artificial pupil, without any interference with the lens itself. On dilating the pupil with atropine, and examining the lens in the erect image, a circular, uniform, dark opacity (from two to two and a half lines in diameter) will be noticed in the central portion of the lens, surrounded by a more or less clear red zone. The cataract, in fact, consists of a layer of opaque lens substance lying between the transparent nucleus and a clear portion of the cortical substance. With the oblique illumination the opacity appears of a uniform light grey tint sharply defined, and surrounded by a margin of lens-substance, which may be either quite transparent or is here and there studded with small opacities. If this marginal zone is sufficiently clear and broad to permit of good sight when the pupil is widely dilated with atropine, an artificial pupil should be made so as to enable the patient to see through this clear portion, and the lens itself is not to be operated on.

Capsular opacities.—The anterior capsule of the lens is often the seat of deposits of lymph due to iritis. These may be confined to the edge of the pupil, leaving the central area free; or the latter may be covered by a more or less thick film, or blocked up by a dense nodule of lymph. Again, after an operation for cataract, the pupil may be occluded by portions of wrinkled opaque capsule, enveloping perhaps remnants of cataractous lens-substance. *Capsular cataract* is distinguished by its white chalky appearance. Strictly speaking, the term is incorrect; for, though the capsule may be thickened and wrinkled, it remains transparent, the opacities being due to deposits on its inner surface. In irido-choroiditis, there is often great proliferation of the intra-capsular cells, subsequently perhaps undergoing fatty and chalky degeneration, which also extends to the lens. *Anterior central capsular cataract* consists of a small opacity occupying the centre of the pupil. When it is very prominent and elevated above the level of the capsule, it is termed pyramidal cataract. It may be congenital, but is more frequently formed in early childhood, in consequence of a perforating ulcer of the cornea.

In cases in which it is doubtful whether or not the crystalline lens is present, and if neither the oblique illumination nor the ophthalmoscope enable you to arrive at an exact conclusion, the *catoptric test* must be employed. This test depends upon the three images which may be observed in a normal eye when a lighted taper is moved before it. Two of these images are erect; the third is inverted. The erect images are produced by reflection from the surface of the cornea and the anterior surface of the lens; the inverted one by the concave posterior surface of the lens. The first two move in the same direction as the candle; the last in the opposite. Now, if the lens is absent from the pupillary area, the lenticular reflections are of course wanting. Moreover, the normal eye will in such a case be extremely hypermetropic. If the lens has been dislocated into the vitreous humour, its situation can be easily recognised in the erect image, for it will appear as a dark lenticular body lying in the lower or lateral portion of the vitreous. If there is only partial displacement of the lens, and not a complete dislocation, its free edge will be noticed as a dark, sharply defined curved line, traversing the red fundus, and forming the outline of the transparent or opaque lenticular disc.

Diseases of the vitreous humour.—Inflammation of the vitreous humour (hyalitis) is, as a rule, a secondary affection, supervening upon inflammation of the retina, choroid, &c. But it appears more than probable that it may also occur idiopathically, and without any perceptible participation of the other tunics of the eye. The progress of hyalitis is best studied when a foreign body (*e.g.*, chip of steel) becomes lodged in the vitreous; for, with the ophthalmoscope, we generally find that the vitreous in the vicinity of the foreign body soon becomes hazy, and the latter surrounded by a greyish veil, which increases in density and thickness the more connective tissue is developed, and assumes a yellow tint if suppuration sets in. In *simple hyalitis* the vitreous is diffusely clouded, the details of the fundus hidden by a grey film, and the sight greatly affected. There are also dark membranous or *thread-like films, which are* either fixed, or float about when the eye is moved.

In the *suppurative* form a creamy yellow reflex is often noticed from the anterior portion of the vitreous, which becomes very apparent with the oblique illumination.

Opacities of the vitreous are best observed in the erect image, the patient being directed to move his eye quickly and repeatedly in various directions, which will cause the opacities to be shaken up and float about. The opacity may be diffuse and extend over the whole fundus, or it may be chiefly confined to the centre, whilst the details of the fundus are distinctly visible at the periphery. But together with the diffuse opacity we generally observe dark, membranous, filiform or reticulated opacities, which are either fixed or floating, and which may be due to blood effusions, to pathological changes in the vitreous cells, or to the formation of connective-tissue elements. To the patient they appear as dark cobwebby spots or flakes, being the more observable the nearer they are to the retina. They occur most frequently in inflammation of the choroid and ciliary body, and especially in sclerectasia posterior. Not unfrequently the opacities of the vitreous are the first symptoms of inflammation of the choroid; and it is not till a later stage, when the vitreous has again become transparent, that the (perhaps slight) inflammatory changes of the choroid are detected. I have often observed this in cases in which the disease was dependent upon syphilis. Effusions of blood into the vitreous frequently cause these opacities, which then yield a peculiar bright-red reflex. But if the hemorrhage is very extensive and diffuse, it may be impossible to illuminate the fundus, and it yields no reflex, but looks quite dark. The chief danger of hemorrhage into the vitreous lies in the fact that it is apt to recur again and again, and may thus lead to detachment of the retina, glaucomatous complications, or atrophy of the eyeball. In the treatment of vitreous opacities we must be chiefly guided by the cause, and by the fact whether they are due to inflammatory affections of the deeper tunics of the eye or to blood effusions. In cases in which the opacities depended upon insidious choroiditis or irido-choroiditis (especially syphilitic), I have often derived very marked benefit from mercurial inunction, combined with the application of the artificial leech to the temple. The latter remedy especially accelerates the absorption of the opacities by preventing and relieving congestion of the choroidal and retinal circulation. If the patient is weak, dry-cupping may be substituted.—*Lancet, March* 11 *and April* 15, 1871, *pp.* 331, 497.

62.—ON THE NATURE AND TREATMENT OF SIMPLE GLAUCOMA.

By the late Professor von Graefe, Berlin.

Simple Glaucoma, its nature.—The doubt felt in former days whether the same process could excite both the inflammatory changes of the typical glaucoma and simple increase of tension, has now been partially removed by our fuller knowledge of secondary glaucoma and by recent alterations in the theory of inflammation. When we see in secondary glaucoma, for example after displacement of the lens, one day simple increase of tension, and the next day inflammatory cloudiness of the media, alternating just as the cause acts more or less intensely, we may be certain of the essential identity of both forms and that they are due to modifications in the intensity and duration of the cause. If we admit the form with cloudiness of the media to be inflammatory, we cannot, I think, deny that the other, which is so closely allied, is also of the same nature, although, for the sake of distinction, it may be very well be called the "non-inflammatory," or "simply secretory" form. The supposition of a simple difference in degree is supported by Cohnheim's theory, according to which inflammation is essentially a species of abnormal secretion. If the cause acts rapidly and powerfully on the vessels, so that the cellular elements pass abundantly into the ocular media, *the haziness* becomes perceptible; whilst if the cause acts more slowly and *less intensely*, the cloudiness is not sufficient to be recognised. A very little *addition* will then render it visible, such as, for example, is produced by the *congestion* after meals.

The real difficulty in respect to glaucoma simplex arises from our *ignorance of any immediate or remote cause.* In secondary glaucoma we find, in one or the other tissue, a stimulus exciting hypersecretion, and as the former is usually permanent, so also is the effect. If temporary arising for example, from a swollen lens, the tension may also again diminish, though if the latter has attained a certain degree and duration, it will persist after removal of the cause; it is doubtful whether this is due to persistent irritation of the secretory nerves or to a continued pernicious reaction by the anatomical results of the increased tension. We can understand how a typical inflammatory glaucoma may leave changes, such as contraction of the emergent veins or alterations of the ciliary nerves, so that, even without a recurrence of the inflammation, the pressure persists and leads to destruction. When there are recurrent attacks of inflammation, we feel more acutely our ignorance of their causes, though, as in other forms of recurrent inflammation, we may refer them to remote conditions and processes in the organism. But when, as in glaucoma simplex, the pressure augments very gradually for months or years (though depending anatomically on the same, but less intense, processes), always advancing and never diminishing, we naturally ask where is the continued stimulus that causes this course. Even if we admit an idiopathic affection of the nerves from some extra-ocular source, it would still be very surprising that the tension never diminishes again. *A priori* it is far more probable that the cause is *intra-ocular.*

Variations in its Course.—The results of *treatment* force us to admit a *latent intra-ocular* cause for glaucoma simplex and lead to the opinion that this cause is subject to fluctuations. Whilst the operation has a perfectly uniform effect in simple inflammatory glaucoma, whilst in secondary glaucoma its various results may be naturally deduced from the nature of the primary cause, we are obliged to admit that cases of glaucoma simplex vary extremely in their ultimate course, even when the pre-existing conditions appear to be exactly similar. The result is often very satisfactory in a relative sense, when the operation is performed at a late period; I mean that after six or seven years the patients continue to see decidedly better than at the time of the operation; in some, operated at an early period, the vision remains for many years in the same state, then gradually deteriorates; in some, again, the disease is not rendered perfectly stationary; and finally, some, fortunately very rare, patients become rapidly blind after the operation. When we accurately determine and record the tension, we find that these differences more immediately depend upon its variations. Thus iridectomy reduces the tension directly and permanently to its normal amount in most cases of simple glaucoma. It reduces it considerably, but does not render it quite normal in others; the vision usually continues in the same state, the eye acquiring, as it were, a sort of adaptation to a moderate increase of tension; yet not unfrequently the sight becomes again worse after a time, or the pressure again increases slightly and gradually, until in either event by a second operation, which I shall afterwards describe, it is rendered permanently normal, and the vision secured. In a third series, the tension is normal or but little increased soon after the operation, whilst at a later period there are from time to time considerable increases, which do not always permanently yield to the second operation. Lastly, iridectomy is sometimes followed by greater instead of less tension, the result being that vision is lost by progressive impairment or by a sudden attack resembling acute glaucoma.

Hence it would almost seem as if iridectomy had such an uncertain effect in simple glaucoma as to render its indication doubtful. This conclusion is found to be quite erroneous when we consider the numerical distribution of the varieties described. It has been already mentioned that in more than half the cases, a single operation renders the pressure permanently normal, and not only preserves, but even gradually improves, the vision for a long period. The second category includes fully one-fourth of the cases, and though our *object cannot be said to be fully attained, yet the result is generally satisfactory: it may be necessary to repeat the operation in some few*

cases in order to secure permanent success. A second operation sometimes stops the progress of the blindness in the third category where the disease occurs; it at all events renders the deterioration slower in comparison with the spontaneous course. The last variety alone is thoroughly unfavourable, blindness being hastened by the operation. Yet this "malignant" course is extremely rare: I have seen it fully developed only five times in some hundred cases of simple glaucoma on which I have performed iridectomy. Judging not only by my own practice but also by that of others, it does not form two per cent. of the cases of glaucoma simplex submitted to operation. Now an operation that gives permanent protection from blindness in more than 90 per cent., renders the course slower in the majority of the remainder, and does harm in less than two per cent. is indisputably indicated, though exceptional bad results, such as never occur in an analogous manner in inflammatory glaucoma, may necessitate prudence in the prognosis.

The effect on the tension is effected in a very instructive manner in the behaviour of the eye, even during the first few days, in part *immediately after the operation*. Whilst, as already mentioned, the tension in inflammatory glaucoma is rendered uniformly normal, with the exception that it may be moderately increased during the beginning of the healing process and that there sometimes remains a slight excess, quite compatible however with permanent success, the wound rapidly heals, and the anterior chamber is refilled immediately after the operation, or in a few hours, exceptionally not till some days afterwards, the state is quite different in simple glaucoma. If we make it our practice to examine each eye immediately after iridectomy by palpation, of course with the necessary delicacy, we shall find that the resistance varies much in glaucoma simplex. Some eyes are almost as soft as (even softer than) the average normal eye after it has been punctured, in others the tension remains greater than it ought to be in the normal eye before it is punctured. We find every degree of abnormal tension between the two. Now the anterior chamber will not be rapidly reformed, when the tension immediately after the operation is considerable; the chamber will not refill till the third, fourth day, or later, even when the tension does not reach quite such a height, though decidedly exceeding that of a punctured eye. If, on the other hand, the resistance is but little greater than that of a punctured eye. The chamber is permanently refilled (the incision being made with a lance-knife) immediately or very soon after the operation. The unfavourable results, noted above, occur when the chamber is slow in refilling. The pressure may even increase somewhat for a few days, during which time the iris and lens are pressed against the cornea, which consequently becomes somewhat hazy in most cases, the eye waters, the congestion is pericorneal and peculiar, due principally to enlargement of the anterior conjunctival veins which do not run in straight lines in their usual manner, but bend at obtuse angles: their inosculations with the episcleral vessels, which are also much congested, are likewise very noticeable. Palpation especially of the ciliary region near the wound, is painful, and the patient complains of more or less ciliary neurosis and loss of sleep; vision decreases in an alarming manner. The chief danger, when the anterior chamber does not refill, is caused by a *consecutive increase of tension (with symptoms of irritation)*, on which the other symptoms obviously depend. The danger is less when there is *no irritation*, that is, when pain on palpation (not spontaneous ciliary neurosis, which is caused directly by the increase of tension), lacrymation, and marked congestion (of which the character is determined ultimately by the state of the tension) are absent; the eye usually becomes softer in some days, and though the chamber does not refill till the second week or later, yet afterwards the course is tolerably satisfactory in most cases. If there is no irritation and the tension is but little increased whilst the chamber keeps empty, we may expect that the aqueous will begin to appear again in a few days, that a little later the chamber will be quite normal, and that the result will be satisfactory.

Though a signally *malignant course* is observed in less than 2 per cent. of the [illegible] of simple glaucoma treated by operation, yet in a much larger pro-

portion, about 10—12 per cent., the chamber is slow in refilling (after the second day), owing to the tension being relatively too great. About one-half of these present symptoms of irritation, which are, however, generally slight, and fortunately disappear under proper treatment, as the chamber refills and the tension decreases. Yet here we find almost all the cases in which the reduction of tension is incomplete or is followed by a fresh increase.

Returning to the "malignant course," we may add that it presents various forms. The irritation may steadily increase during the first few days after the operation, the tension may become so great that the eye, though the anterior chamber is empty, presents a stony hardness, and even the last trace of vision is lost. The cloudiness of the posterior surface of the cornea and a diffuse haziness of the vitreous, which certainly exists, prevent any accurate examination of the fundus. No vision ever returns, though some weeks later the pressure decreases and a shallow chamber reappears. We then find a tolerably diffuse, delicate opacity of the vitreous or retinal separation; I have seen the latter follow in two cases, whilst the tension was decreasing; once indeed the vitreous had been punctured. Sometimes the anterior chamber is permanently obliterated owing to adhesion of the iris and cornea, though the tension ultimately decreases. In other cases the symptoms of irritation may not be so great, or they may remit to a certain extent, yet the chamber continues empty, the tension persists, there is more or less abnormal irritability, and the vision is gradually lost, just as in progressive glaucoma, the field contracting, &c. There can be no doubt that the operation excites a fresh and more acute glaucomatous process, which does not present its ordinary symptoms simply owing to the complete absence of the aqueous humour. Judging by the painfulness of the ciliary region near the wound, this process would appear to spring from irritation of the ciliary body; a further ominous feature is the sympathy of the other eye, even after it has been already operated with success. I have failed to find any reason for this course, either in the manner of performing the operation, or in the personal peculiarities of the patient.

I wish to call attention to the fact that I have seen this course exclusively in *glaucoma simplex* strictly so called (apart from a glaucoma secondary to displacement of the lens, also without haziness of the media), *i.e.*, only where no periodical obscurations of the media could be found by careful and repeated examination. I may say the same of the analogous cases in which the chamber is late in refilling, where the tension remains increased for a long time after the operation, and where there are symptoms of slight irritation. I have never seen such a course in cases of inflammatory or subacute glaucoma with periodical cloudiness of the aqueous humour. I must also add, that all the eyes in question were *very tense* before the operation. There appeared to be in some a peculiar cloudiness of the subconjunctival connective tissue, so that the swollen muscular or anterior ciliary vessels presented a peculiarly dull hue: this point, however, requires further attention.

Hence there must be a difference—and here we return to the subject with which we commenced our remarks—between apparently similar cases of simple glaucoma, owing to which the very same operation may diminish the tension immediately and sufficiently, imperfectly or not quite permanently, or on the other hand may excite a sudden and pernicious increase. We have already learnt that there are cases of secondary glaucoma clearly arising from an intra-ocular cause, in which the latter can be determined only by the antecedents. Such is the form that occurs with posterior cortical cataract after serious choroiditis, at a time when its principal effect, diffuse obscuration of the vitreous, has passed away; such also is the one following retinal hemorrhage at a time when every trace of the latter has disappeared. Just as in these case the cause of glaucoma is latent when the operation is performed, so there may be causes of simple glaucoma, which escape our notice; a great part indeed of the structural and circulatory changes, which affect the eye, are not directly accessible to our present means of examination. We *have already spoken many* times about choroiditis latens, i.e., about choroidal

changes which cannot be shown objectively at every stage, but which are demonstrated by the course of the disease. It is in this way alone that we can accountfor the peculiar reactions after operations on certain forms of cataract. It is quite certain that there are diseases of the vitreous without any ophthalmoscopic symptoms whatever; thus when the lens is very mobile, passing sometimes into the vitreous, sometimes into the anterior chamber, we cannot doubt that the vitreous is unnaturally fluid, and yet we are assisted to this conclusion only by accident.

Important parts, such as a portion of the ciliary organs and the sclera, which are very likely to participate in the genesis of glaucoma, cannot be directly examined. The absence of inflammation in simple glaucoma harmonises with the view that it arises from a tissue with very sluggish nutritive changes and a peculiar vascular torpidity. The differences in the course of the disease and in the results of treatment, may readily be imagined to be due to the implication of particular parts of the sclera, a membrane largely connected with adjacent tissues, and through which various vessels and nerves pass. As in other disturbances of innervation we attend especially to those portions of the nerve passing through bone or tendon (numerous cases of neuralgia and paralysis are now-a-days referred to periosteal irritation at those spots, &c.), so in respect to the ciliary nerves their passage through the sclera seems to me to deserve a thorough examination. I should suspect senile rigidity or pathological contraction of the sclera, because of the interference with nerves containing secretory fibres, and not because it directly compresses the contents of the eyeball, nor yet because the venous circulation is impeded or obstructed (see Stellwag, Der Intraoculare, &c., der Iris, p. 43).

It is a doubtful proceeding, when we are without positive data, to employ hypotheses. Yet, apart from the fact that they are likely to give the necessary impulse to investigation, it seems desirable to us to form such views of simple glaucoma as will not contradict current pathological doctrines and analysis in respect to other forms of the same disease. For these reasons we must suppose, in my opinion, that there is a permanent stimulus in the eye; we are also obliged, owing to the entire similarity of the course and effects of treatment, to consider the disease a *secondary glaucoma* with a varying or at least not uniformly localised *intra-ocular cause.* The cause itself is still doubtful, yet for various reasons special attention should be directed to the sclera in future clinical and anatomical researches.

Glaucoma simplex affects, almost without exception, both eyes successively, indicating that the cause also is symmetrical. Iridectomy is the principal means of treatment. Paracentesis has no permanent effect, though it possibly may be of use in regard to the prognosis. If it reduces the tension nearly to that usually found in a punctured eye, we may be certain that iridectomy will have a permanent effect, and that there is no tendency to a malignant course, or even to an insufficient result of the operation. If again the hardness continues relatively great, the anterior chamber will be slow in refilling and the course will be threatening, though malignant only in a minority of patients. Possibly a methodical repetition of the puncture would reduce the tension, and thus, as the puncture itself has no permanent effect, prepare the way for iridectomy. I cannot, however, yet say whether such a proceeding will succeed, or whether in cases where iridectomy is followed by a malignant course, paracentesis itself would be attended with the same risk. As to the iridectomy, I need scarcely repeat that, in order to reduce the tension with the greatest possible certainty, the usual rules about size and peripheral position (and the avoidance of adhesions, to which we shall return at the end of this essay) must be strictly observed in cases of simple glaucoma. The disease differs in this respect from inflamatory glaucoma, where carelessness in the operation is often enough followed by no injurious effect. The after-treatment, which presented no peculiarity *in the inflammatory* form, here requires much consideration. The tension *of the eye should* be carefully examined immediately after the operation, *or if chloroform* is used, as soon as its effects have disappeared. When the

tension scarcely exceeds the average resistance of a punctured eye, we may expect that the anterior chamber will be soon refilled, and even should this not occur for some days, that the course will be satisfactory with the usual treatment. The continued use of the charpie-bandage is advisable for the prevention of cystoid cicatrisation; atropine may also be applied from the second day with advantage. On the other hand, if the tension exceeds considerably that degree, the eye must be simply closed with plaster. I am firmly convinced that a *bandage applied to a relatively tense eye, decidedly increases the after-danger*. The slightest pain should be opposed by a subcutaneous injection of morphia in the temple. If next morning the pressure is not decreasing—the chamber will, of course, still continue empty—occasional tepid fomentations with chamomile infusion, a purging powder of calomel, and in plethoric people venesection, are advisable. The fomentations, powder, and subcutaneous injection should be repeated during the following days according to circumstances. If the pressure is once decidedly diminished, we may calculate on the chamber being soon reformed, and on the course being tolerably satisfactory, unless the vision has already exceptionally decreased. I do not recommend atropine in these cases during the first few days, because, with the existing tendency (as in chronic glaucoma) it may excite an acute increase of tension. These means during the first few days not only counteract the tendency to a malignant course, but conduce to the completeness and permanency of the reduction of tension, on which the future fate of the eye depends. As already mentioned, the very eyes in which the pressure is insufficiently reduced soon after the operation, are usually the most prone to ulterior deterioration or recurrence.

Supplementary Iridectomy—If, notwithstanding all this care, the vision becomes again worse after it has been stationary for many months, and the tension increases or recurs, the first means, provided the latter is not very great, should be occasional local blood-letting by the artificial leech. I have already on a former occasion recommended this treatment to be pursued some months after the operation, and can now repeat, what I then said, in respect to many cases of simple glaucoma (and of secondary glaucoma from sclerotico-choroiditis posterior). The favourable effect of this treatment is again a reason for believing that this affection is due to some intra-ocular irritation. Should this means fail, it might be a question whether we should have recourse to paracentesis, methodically repeated; my own trials, perhaps not sufficiently carried out, have not given any decided results, and for some years I have abandoned them, because I found that excision of a diametrically opposite piece of iris very decidedly reduced the tension of the eye. I shall treat this subject, already repeatedly mentioned in this paper, specially here, because it is most frequently indicated in simple glaucoma. Many comparative trials in the years 1865–67 proved that excision of the opposite piece of iris had a far more decided effect on the tension than that of the adjacent (even extremely large) portion of iris. These trials were made a few times when both eyes were in almost exactly the same state; the result was decisive, for excision of the adjacent piece had afterwards to be supplemented by that of the opposite portion of iris. I must indeed confess that I have become dubious whether excision of the adjacent piece has any influence over the tension; it is at all events very slight, and will generally not suffice in cases where the first iridectomy has had no sufficient or permanent effect. On the contrary, I could adduce at least a dozen cases, where excision of the opposite piece has had a permanent effect after failure of the first iridectomy.

The Operation for Glaucoma.—I shall conclude with some remarks on this subject. I mentioned at the commencement of this essay, that the rule to excise a large piece of iris up to the periphery is not of equal value in all cases. I consider it of great importance for our object, and it has a certain, though limited, relation to the older rule, that the iris should be carefully and completely removed from the wound, *for any inclusion of it in the cicatrix will certainly increase the secretory irritability of the eye.* Had I to choose *between a coloboma that* does not reach quite to the periphery, but in which

the iris is free, and one perfectly peripheral, but in which one edge of the coloboma is largely included in the cicatrix, I should always prefer the former. The more peripheral the internal wound, the greater is the risk of including the iris. That an inaccurately performed operation will generally answer in very acute glaucoma, may be partly owing to the operator fearing in such a case to make a strictly peripheral wound, and thus more easily avoiding adhesion of the iris. It is necessary to make the internal wound sufficiently long in order that, with a large spontaneous prolapse, the iris may be excised without any excessive traction up to the periphery. I am more and more inclined to advise the operator himself to excise the iris, especially when he is not perfectly accustomed to his assistant. The latter, however skilful, can scarcely apply the convexity of the scissors so exactly to the edges of the wound, or even within the wound itself, as the operator, who using both hands, feels the tension of the iris. Not only must we take care not to leave a peripheral zone of iris (more than the unavoidable minimum) in the very act of excision—the latter need not, owing to the shortness of the wound, be *à plusieurs temps*, as in the operation for cataract—but we must also remember that one or other edge of the coloboma may be included in the angle of the wound. That this is the case, is shown by the corresponding side of the coloboma being not sufficiently long, and the angle of the sphincter being somewhat approximated to the wound. We must then act just as in the operation for cataract. Reposition may be effected by stroking the eye with the convexity of the caoutchouc spoon, and the same proceeding will serve to cleanse the wound of any small flakes of pigment. Should there still remain any shortening of one edge of the coloboma, a fold of iris is included in the angle of the wound, and must be excised. If blood in the anterior chamber impedes our view, the lids should be closed and gently compressed with a sponge dipped in iced water; the hemorrhage will stop in a few minutes, and the blood will escape, at all events sufficiently, if the wound is made to gape and the globe is gently compressed. *In no case should the operation be concluded till we are certain that the iris is completely released from the wound.* The prevention of *posterior* synechiæ, though of secondary importance, should also be attempted. The tendency to their formation may be generally recognised immediately after the operation, by a projection of the angles of the sphincter. When this is the state, I usually let atropine be applied a few times on the day after the operation; in other cases I do not commence with its regular use till the third day (excluding the cases in which the eyes continue excessively tense and threaten a malignant course).

Besides the stricter recognition of these principles, and the more exact indications in the various forms of secondary glaucoma, I consider the diametrically opposite iridectomy an important advance in the treatment. No progress of importance has been made in respect to the *theory* of the operation, notwithstanding many attempts. Old hypotheses are usually dragged forth, little as they avail for the explanation of existing facts. The unhappiest of all, the one referring the effect simply to the wound of the ocular capsule, is periodically brought forward, decked in some new formula, and recommended for adoption. Fortunately for our patients, practice advances independently on the foundation of empirical principles. No doubt, some day a satisfactory theory will be found, but in the meantime we must not be led away by transient hypotheses.—*Ophthalmic Hospital Reports, Feb.* 1871, *p.* 98.

63.—ON CATARACT.

By Haynes Walton, Esq., Surgeon to St. Mary's Hospital.

[*A perfectly* soft cataract is effectually and safely removed by opening the *capsule* and allowing the aqueous humour to come into contact with the opaque *lens* tissue.]

The freer the contact of the aqueous humour, the quicker is the cataract absorbed, but there is a limit to the degree to which such contact is admissible, arising out of the necessity for preventing some disturbing or destructive influences which would otherwise arise. Too much must not be done at once. It should be a great principle, in solution, to procure absorption of the cataract in its natural position. The less the lenticular matter is displaced, the less subject is the eye to irritation. The less, too, the capsule is torn in the early stage of the treatment, the less likely is it to contract adhesions to the iris, and, therefore, the more easy to be disposed of afterwards, if it block up the pupil.

There are two methods of operating—one through the cornea, and the other through the sclerotica. The corneal is more definite and simple, and inflicts less injury on the eye, and the needle is never out of sight. It is the one which I adopt.

At a first operation, all that is desirable is to tear through the centre of the capsule, and to penetrate and break the cataract to a small extent, but sufficiently to admit the aqueous humour to its texture. Dislocation of the cataract is to be avoided, but such displacement is very sure to occur at once, or subsequently if the capsule be much divided. This movement of the cataract, by which it falls into the posterior chamber of the eye, or the anterior, is very apt to cause inflammation, by which the process of absorption is delayed, or the eye even damaged. The same may be said of portions of the cataract escaping from the capsule. Swelling of the cataract always ensues, and is apt at all times to cause the wound in the capsule to enlarge; and, of course, the greater the length of the original tear or incision, the more likely is the wound to enlarge, because, according to the extent of the exposure of the cataract to the aqueous humour, is there increase of the swelling. The greater the atrophy of the lens fibres, the less do they swell. A healthy lens enlarges very much under such conditions. We have an opportunity, sometimes, of seeing the process in accidents to the eye which involve the lens. Another disadvantage of cataract swelling is pressure. The iris may be so affected, and much pain induced, and even disorganising inflammation developed.

During the whole of the period of absorption, the pupil should be kept dilated. By this, adhesions between the capsule and the iris may be prevented, and sometimes pressure on the iris avoided. It has been supposed that expansion of the pupil may be the cause of dislocating all or some of the contents of the capsule; but this is erroneous. On the contrary, dilatation may be advantageous in causing any detached portion of the cataract to fall into the anterior chamber instead of into the posterior, the far better position, because inflammation is so much less likely to ensue when it is occupied.

Very slight irritation follows a well executed operation on an eye which is not complicated with some other disease, and there is not the necessity for that strict observance of quiet so essential in the operation for extraction. However, the patient should remain in the house for a few days, and bright light should be excluded. If acute inflammatory action arise, it must be regarded as traumatic, and treated as such. The eyeball invariably gets harder if the slightest inflammation supervenes; but this symptom need not create the least alarm, nor should it call forth any particularly active treatment under the fear of glaucoma supervening. Glaucoma never has a traumatic origin. It is difficult to understand why it is that the eyeball does not become hard in idiopathic inflammations, even when they are intense. An eye may become destroyed from rheumatic or syphilitic inflammation without ever getting hard.

The pain which always follows the operation for solution, but is generally very slight, must not be mistaken for the commencement of an attack of inflammation. So long as the objective symptoms of acute inflammation are absent, narcotics, and the application of cold lotions, need be employed. Vomiting sometimes ensues, especially if any portion of the cataract become dislocated. Ice broken in little lumps, and taken by the mouth, generally stops it.

Results.—I will now consider the effects of portions of the cataract in the chambers of the eye, because fragments may escape from the capsule in spite of all care. When the cataract has become very soft in its superficies, some of the degenerated matter generally falls into the anterior chamber, and is soon absorbed. If there should escape much of the broken cataract, the plan is to wait and see what happens. It might be absorbed without any disturbance. Should severe pain come on, the displaced material ought to be evacuated by an incision through the cornea, assisted by the spoon of the curette. If the entire cataract should fall into the anterior chamber, or the nucleus of it should follow the soft superficies, extraction is the rule; yet I should be inclined to wait for symptoms before I acted, because absorption might proceed uninterruptedly, but slowly. Agonising pain of a neuralgic character in the eye, forehead, and head, is the precursor of dangerous inflammation. When the cataract, or its nucleus, or a large fragment, has fallen into the posterior chamber, much disturbance is likely to arise from pressure on the iris. The treatment is either to depress what is lying there, or to bring it into the anterior chamber with a cataract needle, and then to extract it.

The time required for absorption depends on the stage of the cataract, and the patient's age: the more the lens fibres have undergone atrophy, and the younger the individual, the quicker will be the removal. A single operation suffices in some instances, especially in infants, and it certainly will be sufficient when the lens has degenerated to fluidity; but for the most part repetition is necessary. If after the lapse of four or five weeks there is not evidence, in the flattening of the capsule and the concavity of the iris, that absorption is proceeding sufficiently fast, or if the aperture in the capsule should close, the operation is to be repeated. In such repetitions, the cataract tissue should be more freely broken up. At the last operation the anterior capsule should be torn across, with the object of clearing the pupil. If a sufficient interval between the operations be allowed, there are few cases which will not yield to two or three operations. Congenital cataract should be operated on before the eyeball begins to oscillate, and a child may be safely submitted to the operation after the first month of life.

The operation for solution is certainly the safest of all for the removal of cataract, as regards any immediate or secondary danger to the eye, and from none other is so much success to be got. It is one of the most scientific and beautiful operations in surgery. Not any one damages so little—that is, has so few drawbacks. It embraces all the superiority that we claim for subcutaneous operations, in general surgery, over surface wounds. It can be sufficiently well done by anyone with the least aptitude for operating. It is the easiest of all the operations for cataract. It is the appropriate one for soft cataract, beyond the possibility of a doubt. If any method of curing cataract without a surgical operation be ever discovered, absorption will be the process.

This old English operation, which removes the cataract and spares the eye the risks of extraction, is at this period apt to be neglected, because not sufficiently taught, in consequence of the love of novelty, the force of fashion, and enthusiastic admiration of some inferior foreign methods. I am quite sure that if it were one of modern discovery it would be universally hailed as the greatest boon which ophthalmic surgery had ever received. On some other occasion I will tell you about the operations which some surgeons employ for extracting soft cataract.

After the cataract has been removed the capsule may not roll up or contract sufficiently, but occupy the pupil and impair vision. In such a case an operation must be undertaken, by which a sufficiently clear space can be made for the transmission of light to the retina. This is, in fact, making an artificial pupil, the rules for which will be given when I come to speak of making false pupils. All that I need say now is, before any such operation be undertaken, you should be sure that the capsule does obstruct *vision.* Trying the sight with test-type is the only way to discover the *truth.* A small bar of capsule passing across the pupil, or a piece of cap-

sule jutting out a little beyond the margin of the pupil, does not necessarily interfere with vision. *Med. Times and Gaz., Dec.* 31, 1870, *p.* 749.

64.—HYSTERICAL CLOSURE OF ONE EYELID CURED BY GALVANISM.

By Frank H. Hodges, Esq., House Surgeon to the Birmingham and Midland Eye Hospital.

A female servant, aged sixteen, was brought here from a country town on the 17th February, by her mistress, suffering from inability to raise the right upper eyelid. On inquiry, it was found to have existed upwards of six weeks, and to have resisted a variety of both external and internal remedies; the former consisted of large blisters across the brows, which were still unhealed, and according to the patient's account, of galvanism to the temples. The mistress had been alarmed by the surgeon in attendance giving it as his opinion that the affection was due to disease of the brain. The appearance and age of the patient, together with the absence of any other implication of the third nerve, suggested hysteria as the cause; and this diagnosis was borne out by the fact that on raising the affected lid with the finger whilst the patient's attention was attracted by an examination of the sound eye, and then removing the support, the eyelids remained open until the patient, suddenly recollecting herself, again closed them.

My friend Mr. Maberley, a student of the Queen's Hospital, who saw the case with me, and who had about a month previously witnessed the immediate cure of hysterical aphonia by the sudden galvanic shock applied directly to the vocal cords by Dr. Morrell Mackenzie's apparatus, suggested that similar treatment would be applicable in this case, which was carried out as follows. The patient having been previously told that an immediate cure would result from the operation, one conducting wire of the galvanic battery was applied to the outer canthus, and, the instrument having been wound up to its full strength, the other wire was brought down upon the inner canthus. The effect was startling, the patient screaming and clutching at her eye; and when the hand was removed the eyelids were found to have regained completely their natural action. To ensure a lasting impression upon the patient's mind, the operation was repeated, and she went away, having returned many thanks for regaining the power she had lost for so many weeks. Nothing has since been heard of the girl, and, as her mistress promised to bring her at once to the hospital should the symptoms recur, it is concluded that she continues well. *Lancet, March* 18, 1871, *p.* 378.

65.—CARBOLIC ACID IN OTORRHŒA.

By John P. Pennefather, Esq., London.

The following cases, as examples of the almost uniform good result attending the use of carbolic acid as an injection in chronic otorrhœa, may not be uninteresting to the profession. I have taken them at hazard from some hundreds which I have treated in a similar manner at the Royal Dispensary for Diseases of the Ear. In a few instances in which its application failed to entirely cure, it not only lessened the secretion considerably, but deprived it of the disgusting fetor by which it is usually characterised—a boon of no small moment both to the sufferer and surrounding friends. The proportions in which I have prescribed it, are: carbolic acid, one drachm; glycerine, one ounce; distilled water, five ounces. I have never found it create the slightest irritation, and the only complaint I have heard was when a too vigorous application of the syringe forced the fluid through a perforated membrane into the mouth.

Case 1.—Wm. W. fell from a ladder four years ago. Had suffered from profuse, highly offensive discharge from his right ear ever since. On Nov. 13th he was ordered to syringe with carbolic-acid lotion three times daily. Discharged, completely cured, on Nov. 26th.

Case 2.—Mary Ann W. has suffered from highly offensive discharge from right ear for three years, after scarlatina. On Nov. 12th was ordered to syringe with carbolic-acid lotion. Discharged, well, on Nov. 26th.

Case 3.—John W. W. Discharge from right ear for twelve years; attributes to a severe cold. On June 17th was ordered to syringe with carbolic-acid lotion three times daily. Discharged, well, on July 1st.

Case 4.—Henry B., aged three years. Discharge from both ears for twelve months, after whooping-cough. On Oct. 28th was ordered to syringe thrice daily with carbolic-acid lotion. Discharged, well, on Nov. 18th.

Case 5.—Jane W. Discharge from left ear for ten years, after scarlatina, highly offensive. On July 6th was ordered to syringe with carbolic-acid lotion three times daily. Discharged, well, on Nov. 25th.

Case 6.—Mary S. Discharge from left ear for fifteen years, after scarlatina. Complains much of its offensive character. On June 8th was ordered to syringe with carbolic-acid lotion four times daily. Discharged, well, on Nov. 18th.—*Lancet, Dec.* 3, 1870, *p.* 804.

66.—OBSTRUCTIONS IN THE EUSTACHIAN TUBE.

By Dr. Peter Allen.

[The following is an epitome of a paper read before the Medical Society of London.]

The author described the methods most recently devised for overcoming obstructions in the Eustachian tube, especially such as result from catarrh, and also for inflating the tympanum, with the latest improvements made upon the instruments in use for these purposes. The subject was introduced by a brief sketch of the functions of the parts intended to be influenced, the different methods hitherto adopted, and their relative value. The method particularly dwelt upon, for its high practical value, simplicity, and general efficiency, was that named after its originator, the "Politzer method," which may be shortly described as follows:—The surgeon places the tube within either of the patient's nostrils, or, with Dr. Allen's most recently improved contrivance, simply presses the nasal pad gently and firmly against them. The patient then swallows, by degrees, a small quantity of water previously taken into the mouth; and the surgeon, at each successive act of deglutition, compresses the air-bag held in his own right hand. Currents of air are thus repeatedly sent into the naso-pharyngeal cavities, driving warm air into the tympanum through the Eustachian tubes, and overcoming at once any moderate degree of obstruction in the latter. The modifications of this appliance, introduced by Dr. Allen, consist of an interior valve, enabling the acts of inflation to be repeated as often as desired, without the necessity of removing the instrument from its position; and also of the double pad placed against the nostrils of the patient, thus dispensing with the rather disagreeable and troublesome procedure of inserting the tube into the nostril. Even young children do not cry, nor are other persons frightened, at this simple and easy mode of managing inflation. It causes no pain or distress, and the results are often at once so happy as to astonish the patient.

Personal testimony was borne by one of the Fellows present to the immediate relief afforded him, when suffering from catarrhal deafness, by Dr. Allen's use of the described apparatus.—*Lancet, Feb.* 18, 1871, *p.* 232.

AFFECTIONS OF THE SKIN, ETC.

67.—A POINT IN THE EARLY (CONGESTIVE) STAGES OF SKIN DISEASES.

By Dr. TILBURY FOX, Physician to the Skin Department of University College Hospital.

[We believe that there is a steadily diminishing confidence amongst the more enlightened practitioners in arsenic as the remedy for every cutaneous ailment. It is too long over its work, even when it does cure, which is by no means always certain.]

To give a practical turn to this note—for I do not dignify it by the title of "paper"—let me refer to one important principle of treatment to which I think we do great violence in our treatment of skin complaints—the principle of using soothing remedies locally to all conditions and stages of cutaneous maladies in which *active* congestion is a feature.

By a soothing treatment, I mean such as prevents congestion, and secures the exclusion of air from the diseased part. The access of oxygen is the great accelerator of changes in the inflammatory stages of skin diseases, especially where the cuticle is more or less destroyed or absent. The remedies that most effectually soothe are baths of various acids, astringents and powders, and simple non-rancid unguents to which astringents are added. Sometimes fatty substances rather increase the irritation, especially if at all rancid. Now what is this kind of treatment, especially for the exclusion of air, but the securing of *rest* for the skin. In proportion as our knowledge of the pathology of disease increases, we learn the definite influence of external conditions and agencies in operation upon the skin in a diseased state, and acts and agencies which we thought of little moment, or even insignificant for or against the cure, appear to us, in the progress of our better knowledge, of great importance. It is sometimes difficult to bring ourselves to believe that simples are most efficacious; the very simplicity makes us attach little importance to these simples. We are very apt at the mention of them to say—"Oh, yes, I know that of course," but to neglect, nevertheless, what we feel without hesitation is so self-evident on reflection. These simple things, indeed, are overlooked in practice. In the early stage of a disease which general experience has taught us will very likely become chronic, and, it may be, pertinaciously obstinate, the natural idea and desire is, cut it short, if possible, by heroic measures. I do believe that this feeling leads us to do more harm than good in the early congestive stages of many skin diseases.

Now a simple soothing plan of treatment, therefore, acts in two ways:—First, negatively, in so far that it takes the place of the use of more powerful remedies that would increase congestion; and secondly, that it directly tends, of course, to diminish congestion. This suggests the question—What relation has congestion to disease?

Take urticaria: here it is secondary to the loss of tonicity consequent upon perverted innervation. Take psoriasis: it is now taught that this disease is merely an overgrowth of the cells of the rete, due to hyperæmia and statis in the capillaries of the papillary layer of the skin. Take lupus: it is the consequence of the demand made upon the circulation for sustenance, by a rapid growth of entirely new granulation tissue. In the first, congestion is of little importance *per se;* in the second case (psoriasis), at the outset, it is the most important point to be alluded to; for if we can cut off the supplies, the hypertrophic growth of cells cannot take place; and in the third disease (lupus), secondary though it be, to the real mischief, yet it may, under certain circumstances, be a possibility, where the disease for instance is just beginning, to check the congestion, and thereby starve the disease into submission. It is in the earliest stages, before the deep vessels are seriously involved, and when the congestion is impressionable, that our soothing remedies *do great good,* and it is also at this time, and under these circum-

stances, that the use of irritants is sure to do harm. So fully am I persuaded of this from clinical observation, that one of the principles of treatment which I most dogmatically teach to students with, it may be, tedious reiteration, is this:—"Wherever and whenever, you meet with a hot, red, tender, and irritable skin complaint, be sure you do not apply any irritant, but invariably soothe."

I will mention diseases in which the adoption of this principle of treatment is often accompanied by eminent success:—Acute general psoriasis of the young; erythema and acne of the face; erythematous lupus; lichen ruber; eczema, and syphilitic roseola.

Acute General Psoriasis.—Some of the best results I have ever seen in the treatment of this form of disease have been in young children recently under my care in University College Hospital. I found that the application of tarry applications have considerably increased the congestion of the skin; the disease has consequently spread, and I am sure been prolonged; but with alkaline and bran baths each night, with subsequent oiling, and prescribing cod-liver oil and good living, I have soon put my patients into good condition again. This is my plan in future for all cases of acute general psoriasis where the skin is much congested.

In regard to the use of tarry preparation in psoriasis in general, I am convinced that when congestion is at all well marked it should be used with caution, and if it irritate I prefer the use of wet packing for a little time before recurring to its use again.

Erythema of the Face and Acne.—Very recently we have been pitting different plans of treating acne and erythema of the face, one against the other, amongst my patients at University College Hospital. It so happens that a good many American physicians have been to see our practice after visiting Hebra's Clinique at Vienna, and have as usual eulogised the soap treatment in vogue there. Well, we have tried it, but I will not try it again—for all my cases have got worse wherever there has been any marked congestion. In cases of torpid action of the skin of the face generally, unquestionably it rouses the sluggish follicles into activity, and helps the cure of the disease, but it then acts in the same way as do the many compounds of sulphur in repute; but in the early stages, and where the face flushes actively after meals or exposure, soothing remedies, and none so good as a lotion made with about half an ounce of pale prepared calamine powder—frequently applied after hot bathing, with suitable internal remedies to meet dyspepsia, pyrosis, and uterine troubles—never disappoint it seems to me; but stimulants applied externally, whilst they now and again act happily in the early stages, very oftentimes extend the congestion much beyond the original area and degree. I am not speaking of course of the chronic stages of disease.

Lupus.—I speak especially of erythematous lupus. Clinically, the results of employing some mild lotion containing an impalpable slight astringent powder, are very satisfactory. This is my favourite plan of treatment, in connexion with suitable internal remedies, for anæmia, sparcity of fat, lymphatic or strumous temperament, under-feeding, and so-on. The most suitable cases are those in which the disease is so thin that the pressure of the finger occasions the congestion to disappear, and nearly as it were obliterates the disease. There may be specks, or almost tubercles, here and there formed by the new granulation tissues, which can be destroyed by caustic potash in solution, the use of the soothing remedy not in the least being interfered with. Given a mass of new lupus tissue and much congestion, the certainty is that the former will spread if irritants are applied; lessen the surrounding congestion, and the disease will, with perhaps one application of caustic, rapidly go. I speak from actual cases recently under my care. The object is to check the congestion, and so starve the disease or cell change that induces the congestion.

Lichen Ruber.—Is a very rare disease in England. I have recently seen two cases of the disease which illustrate my point so well that I cannot help referring to them. This disease is characterised essentially by the development of solid *red papules* (lichen ruber), caused by the effusion of lymph about

the hair follicles. In one of the cases I have had no difficulty of seeing the early stage of this disease, and it commenced by rapid engorgement of the follicular plexuses; it seems to me to be dependent upon disorder of the sympathetic nervous system. The skin is generally red, and "burns" intensely, the congestion being increased by excitement and worry and dyspepsia. In fact, the capillary congestion seems to be quite in character, like that of blushing. Now I know, as the result of careful experiment, that it is very easy to aggravate the congestion in lichen ruber. Too hot a bath will do it —the heat of the bed—warm drinks—a cold wind; sleeplessness, with the mental irritation attending it, will do so. Even arsenic, which is said by Hebra to be *the* remedy for the disease, if pushed far enough, will certainly, as in one of my cases, increase the irritability when its semi-poisonous operation fairly commences.

The exclusion of air by a semi-paste made of zinc, glycerine, and liquor plumbi I found very efficacious, and when arsenic failed my case got well with that external application, and the free exhibition internally of assafœtida.

Eczema.—Without entering into the intimate pathology of eczema, I may be permitted to say that it seems very clear that there is no special blood state or diathesis upon which eczema depends, but that it results from in the first place, perverted innervation—this being capable of directly inducing, not only vascular changes, but even changes in the cell elements of the skin. The grounds upon which this view of eczema is taken, and on which I base the assertion that eczema is a catarrhal inflammation of the skin, have recently been discussed in the Lettsomian lectures, which I delivered before the Medical Society of London this session. My point now is, that the application of soothing remedies acts in eczema in the early congestive stages in two ways.

It allays irritation of nerves directly—hence the value of applying poultices and fomentation; and secondly, it diminishes the congestion, which favours the "discharge" of eczema. The vesiculating process breaks away the cuticle, leaves the rete and it may be the derma exposed, and favours the free access of oxygen. The glycerine plasma and oxide of zinc and starch powders and pastes act under such circumstances with the best effects.

I might refer to other diseases, but I think I have said enough to indicate the value of following the very simple principle of treatment under discussion. I hope it will not be thought that I am at all inclined in any way to side with those who advocate "the expectant treatment of disease," as far as, for instance, to the exhibition of mint water in acute rheumatism. I am scarcely so cruel as that. I yield to none in the freedom and faith with which I use even potent drugs to skin mischiefs after their congestive stages have passed or succumbed to our remedies. Nor do I think the use of soothing remedies at all part of a do-nothing system. Negatively, it prevents much harm, and positively lessens tissue changes, through its control over congestion.

One more point I am anxious to call attention to touching the influence of active congestion in skin diseases. It is of little use to treat the congestion itself when the cause of the congestion is exceptional, such as the free circulation of excreta. This is a very active cause of intensification of congestive phenomena. It constantly happens that soothing remedies fail where we should expect them to act satisfactorily. The reason is that we overlook conditions of the fluid circulating through the capillaries of the diseased part, which do neither more nor less than "irritate" from within as much as cold or acrid substances do from without. The retention of excreta from deficient kidney action, or liver action, and gout, at once occur to some here. We speak of gouty eczema, gouty psoriasis, gouty lichen. To our minds these expressions mean that gout causes the eczema, the psoriasis, the lichen, as though it could be the *vera causa* of pathological processes the most dissimilar. To me they mean that these diseases may occur in gouty subjects, and are intensified, aggravated by the circulation of retained excreta, and that the treatment should be adapted to remove the exceptional *cause of irritation*,—which will ensure chronicity, if not removed,

—in conjunction with the remedies appropriate to the eczema, psoriasis, or the lichen, &c.—*Journal of Cutaneous Medicine, Dec.*, 1870, *p.* 166.

68.—REMARKS ON THE RATIONALE OF THE ACTION OF ARSENIC ON CUTANEOUS AND OTHER DISEASES.

By Dr. JOHN CLELAND, Professor of Anatomy and Physiology, Queen's College, Galway.

[The cases in which Dr. Cleland has seen the greatest advantage from the use of arsenic have been mostly of a description in which its virtues have been very generally admitted, such as cases of eczema and psoriasis in patients of a gouty or rheumatic diathesis: cases of psoriasis in conjunction with uterine affections; chronic inflammatory uterine affections even though unaccompanied with cutaneous disease; persistent rheumatic ophthalmia, and cases of lupus and palatal ulceration.]

If we review the physiological actions of arsenic, in the hope of their shedding some light on its therapeutic properties, we probably cannot have a better guide than the Memoir of M. Lolliot. From experiments on dogs and rabbits, M. Lolliot concludes that "arsenic exhibits two fundamental properties: first, depression of temperature; secondly, diminution of the urea in the urine." He proceeds then to say, that "it is with justice that M. Sée has now ranged arsenic among the *medicaments d'epargne*, besides alcohol, coffee, &c. Arsenic, according to M. Sée, owes this property to direct combination with the blood globules. This combination, according to him, is made at the expense of the oxygen, of which arsenic takes the place—and the globules, deprived of their oxygen, are no longer fit to oxidise our tissues, and the denutrition of these is thus lessened. In fact, in the bodies of persons poisoned with arsenic it has been observed that the globules are conserved—that is, that they are preserved from decomposition in consequence of the want of ogygen. Arsenic prevents then the globules from being charged with oxygen in the lungs, and so renders them incapable of oxidising the tissues; from this arrest of combustion results fatty metamorphosis of the organs." M. Lolliot is unable to find by experiments on animals any effect produced by arsenic on the respiration, and imputes the "singular property which arsenic possesses of rendering the respiration easier," which he considers demonstrated by observations on arsenic eaters, to the reduced denutrition of the tissues. So also in arsenicism, or slow poisoning with arsenic, the motor paralysis and somnolence produced, being accompanied as they usually are, with emaciation, may, he thinks, be reasonably imputed to the imperfect nutrition of the brain and cord. He finds that arsenic is eliminated by the skin, mucous membranes, kidneys, and liver, and in large doses produces fatty degeneration of the liver and kidneys. From this account, even keeping the theoretical part of it out of view, it appears pretty plainly that it is unlikely that the therapeutic benefits of arsenic are due to elimination by promotion of the ordinary action of the emunctories. Particularly, it is unlikely that it promotes the elimination of a *materies morbi* by means of the kidney, when experiment demonstrates that it acts with certainty as a diminisher of the total amount of urea secreted in twenty-four hours. No doubt that diminution of urea depends most probably not on action on the kidney, but on the material from which urea is formed, and it is quite possible that, although by that action the work thrown on the kidneys is diminished, the kidneys may yet have their efficiency increased in accomplishing the work which is left to them; and this seems the more probable, as the very irritation which in excess produces fatty degeneration might be expected when more moderate to stimulate the proper function. But it is noticeable that while arsenic diminishes the urea it does not seem to increase the other ingredients of the urine, even though it is itself eliminated, at least in part, by the kidney. Neither is its action due to increase of the amount of intestinal secretion,

for in those instances in which it is most efficacious there is no diarrhœa whatever, and if that symptom should threaten, it is necessary immediately to take the hint and discontinue the exhibition of the remedy. Neither are the secretions of the skin increased so as to constitute arsenic a sudorific; and yet on integumentary surfaces a certain action is exercised of a very definite nature, as shown by three usual effects of medicinal doses,—the silvery tongue, plumpness of the face, and irritation of the conjunctiva. Of these the silvery tongue described by Begbie is generally first to appear, and I think I may say that I have never seen any therapeutic effect produced without the tongue having a silvery appearance—an appearance due altogether to a change in the epithelium, probably to thickening of it, but certainly not produced by adherent deposit. The plumpness of the features, so far from arising from any œdematous condition, looks perfectly healthy, and is best marked when the remedy agrees with the patient. But the irritation of the conjunctiva is often absent, or is unobserved by the patient, although the therapeutic advantage sought has been gained. When it is present it is not a condition marked by increased secretion, but redness and a certain soreness, or "prickliness." I take it that all the three symptoms,—the silvery tongue, the plump appearance of the face, and the red conjunctiva, are indications of one state of matters, injection of the superficial capillaries supplying nourishment to a rapid growth of epithelium.

We have now, I think, brought before us two very marked sets of physiological properties of arsenic in medicinal doses, not obviously connected one with the other: first, the arrest of processes of decomposition, as evinced in experiments on animals by diminished secretion of urea and reduction of temperature; secondly, increased nutrition of epithelial surfaces, as evinced by the phenomena we have just considered. The second set of properties might of themselves be supposed to furnish some explanation of the therapeutic benefits in cutaneous diseases, but it is on the first set of properties that we must fall back for an explanation of the benefits derived in rheumatic affections; and considering that the cutaneous affections are often connected with rheumatic habit, the beneficial effects on these are probably also derived in some measure from the first set of properties.

I have stated already why I think that the groups of affections associated with rheumatism and gout have probably all of them this in common, that the tissues are acted on by a poison in the blood, a product of denutrition, and that the poison is different in different sets of cases. I would further add that the group probably is divisible into two very different sets of cases: first, there are those in which only the normal amount of debris is thrown into the blood, but it fails to be sufficiently rapidly removed by the emunctories, and the question might be raised with regard to those, whether the emunctories are to blame or the debris of tissue has an abnormally slight tendency to decomposition; secondly, there are those in which debris of tissue is thrown too rapidly into the blood, from deficient elaboration of the substance of the tissues, rendering them prone to rapid decay; and possibly a third set of cases might be distinguished in which the emunctories have too much work thrown on them by overabundant new supplies of material being constantly thrown into the blood. In lithic diathesis, there can surely be little doubt of the truth of the distinctions now drawn: typical gout belongs to the first division now made, and I have no hesitation in believing that the cases marked by lithic diathesis in which arsenic does good belong to the second group. If this be the case, and we consider that arsenic circulating in the blood has the property of preventing processes of decomposition, we have a ready explanation of its benefits in those cases.

The circumstance that creosote and kindred antiseptic substances are of much use in some rheumatic affections would corroborate this view of the mode in which arsenic is beneficial, and so also would the consideration that those cutaneous diseases in which arsenic does good are those in which tarry and such like applications are of use. Tar in psoriasis, although applied *to the surface, certainly* must exert its influence, not on the superficial,

but on the young strata of epithelial cells,—for it is only by a change in the young strata that the diseased superficial strata of epithelium can be replaced by healthy; and it is quite possible that the influence which it exerts on the young epithelium may consist in prevention of a too easy oxidation —in fact be of an antiseptic character. But it may be questioned if any remedy combines like arsenic the property of preventing waste of tissue with that of fostering growth of the epithelial textures.—*Journal of Cutaneous Medicine, Dec.* 1870, *p.* 190.

69.—ON THE TRANSPLANTATION OF SKIN.

By CHARLES STEELE, Esq., Surgeon to the Bristol Royal Infirmary.

[The vital power of portions of transplanted skin has been repeatedly proved in cases of total detachments, as well as in the remarkable results of plastic operations. It appears that Dr. Frank Hamilton, of New York, first suggested this plan as early as 1847, but put it into operation for the first time in 1854, in the case of a man who had lost a large portion of integument of his leg by an accident. He did not, however, discover that the graft might be wholly separated before insertion. M. Reverdin demonstrated only recently that the portions of skin might be taken from any part of the body.]

M. Reverdin's paper on Epidermic Grafting was read before the Surgical Society of Paris in December of last year, and published in the *Bulletin* of the Society for that year, and also in the *Gazette des Hôpitaux* for January 11th and 22nd, 1870. Mr. George Pollock heard of M. Reverdin's experiments in May last, and immediately tried the treatment on a most suitable case, in a child eight years of age, who had been in St. George's Hospital for three months and a half with a very extensive burn of the right thigh, of more than two years' duration. The ulcerated surface extended from the buttock to the knee; it was broad above, narrow and pointed below. The progress and success of this case attracted considerable attention, and the practice was soon adopted in most of the London and several provincial hospitals.

In applying this treatment to ulcers, we must bear in mind the two leading objects of treatment—firstly, rapidity of cure; and secondly, permanence of cicatrisation. The following points are of importance to consider when we are about to operate: the state of the ulcer; the size and number of pieces to be grafted; how near they should be placed; whether the whole or only part of the cutis should be inserted.

It is necessary that the granulating surface be in a healthy or tolerably healthy condition. This was insisted on by Mr. Pollock and Mr. Lawson in an interesting discussion at the Clinical Society on November 11th, and has been felt to be an essential by all who have practised the operation; and, where failure has followed skin-grafting, an ill-conditioned state of ulcer has generally been the cause. I feel that, where there is any marginal cicatrisation, or disposition to form the same, grafting may safely be practised, and the process from the margin will rapidly advance.

With regard to the size of pieces of skin and the depth of true skin to be used, it has been clearly shown that those employed by M. Reverdin and Mr. Pollock and many others, of the size of a millet-seed or an oat, whether including the whole or only part of the cutis vera, answer admirably; while the minutest subdivisions, as carried out by Mr. Dobson at the Bristol General Hospital in some striking cases which he brought before a meeting of the Bath and Bristol Branch of the Association on October 27th, set up rapid cicatrisation; and portions of entire skin a quarter of an inch in diameter also answer well. From these facts it is evident that all that is essential is the papillary layer of cutis, no matter how small, capable of *developing* cuticle, and therefore cicatrisation. But in dealing with *individual* cases, I feel it right to bear in mind the size of the cicatrix which

will result, and the strain to which it will be subjected. While, therefore, on the grounds of economy of skin and consideration for the patient, we should use little skin in such ulcers as will not be subjected to great strain, yet in those which will, as large ulcers on the leg, which, after being healed, frequently disappoint by breaking out again, it is most evident that to transplant a number of fair-sized portions of entire skin, which will retain certainly their elasticity, and so, by their individual stretching, relieve the tension of the whole surface, is the most likely to be permanently successful. Transplanted skin does not retain its perfect integrity and function, as does skin employed in Taliacotian operations; since, in the first place, we cut it so close to its under-surface, in order to avoid flat and areolar tissue, that we must cut through most, if not all, the sweat glands and hair-bulbs; and, secondly, the new piece sheds its epidermis, and for a time takes on the appearance of granulations, and, when cicatrisation has taken place, has more the smooth look of a cicatrix than the furrowed and soft appearance of true skin. Yet it contains its elastic tissue, is thicker in consistence, and has a more natural feeling and appearence than the cicatrix formed around it. Experiments have shown how little may be used with good results; they will yet show, I feel sure, that far larger portions may be employed than have yet been, and with greater advantage, as, for instance, in relieving contractions from burns. I have now under treatment a case of this nature, in which I expect to show that a piece of the size of a penny will succeed, and give elasticity in a situation where it is greatly needed—namely, in the bend of the elbow. It is clear that, the greater the number of centres, the more rapid the cure must be, and the firmer the cicatrix; but I am inclined to think that, in a large surface, the same sized piece of skin would prove more useful if employed in a series of graftings than if distributed in exactly the same spots at one operation; for I am convinced that each series gives fresh life and vigor to the whole surface. For the same reason, since each graft is found capable of developing a cicatrix from a quarter of an inch to an inch in diameter, it is wise to insert the portions of skin from an inch to two inches apart, and subsequently place fresh points between these.

In operating, a portion of skin is pinched up in a forceps, or between the finger and thumb, and removed, either in the entire thickness or in part: it is essential on the one hand that no areolar tissue and fat, on the other that the papillary layer of cutis, be removed. The granulations, if quite healthy, need only be clean; if not quite bright and active, they are slightly incised or scratched; and, when bleeding has stopped, the graft is laid upon the surface. The portion removed is easily cut up, if desired, on the thumb-nail, and each portion can well be applied with the point of the scalpel. Some use a narrow strip of ordinary plaster, some transparent isinglass plaster, others Lister's lac plaster. I have used these, and also a strip of gutta-percha tissue, which holds the portions of skin firmly in place, and being transparent, enables one to see, while stretching it across, that the grafts do not slip. Over these, strapping, water-dressing, or any lotion suitable to the state of the granulations, should be applied; then a compress of cotton-wool, retained by a bandage, rather firmly applied, to insure close adaptation of the grafts to the granulations; the wool also serves to keep the grafts warm. I feel it wise to avoid ointments in the early dressings, as particles of grease might insinuate themselves beneath the transplantations and separate them. Unless there be copious suppuration, it is well not to disturb the dressings till the second day; the appearance then presented is the epidermis of the graft lying free on the granulation dressings, or on the graft; if spread out, it shows the original size of the graft, which now is contracted and pale. During the next few days, the graft becomes vascular, and looks very like the surrounding granulations, and is nearly lost to view unless it be of some size, when it appears as a raised mass. It is difficult, and sometimes impossible, for even the operator to distinguish the grafts, if small, for the first seven to twelve days. The *first indication of activity* is a faint blue cicatrising aspect in the site

of the graft, and I also observe, if the graft be near the circumference, a line of cicatrisation running from the circumference to the graft, and one from the graft to the circumference, which unite and increase to a band, and so increase again the cicatrix-producing margin; in fact, these lines shoot out in various directions to any near margin or points, and thus in time may divide an ulcer into a series of smaller ones. One fact of great importance and value, and which shows the remarkable influence of the transplantations on the whole ulcer, is the rapidity with which cicatrisation from the margin proceeds directly the grafts have established themselves, and even before they show much cicatrix of their own. Mr. Couper, observed the same fact in a case under his care in the London Hospital, but remarked that he was not prepared to consider it more than a remarkable coincidence. I however, feel it to be one of the most valuable immediate effects of transplantation, that the grafts act as natural stimulants to the ulcer generally, and arouse renewed energy in the marginal cicatrising edge, wearied with its previous almost hopeless exertion.

Another field of usefulness is open to skin-grafting in case of severe lacerated wounds needing partial amputation, or involving considerable sloughing; where the prospect of being able to transplant when granulation is fairly established, will enable us to save more of valuable parts than we should otherwise have ventured to leave uncovered by any skin, trusting alone to granulation. Such a case was recently admitted into the Bristol Infirmary. A man had his fingers and hand severely crushed and lacerated by cog-wheels, the skin in rags, the muscle mashed, and the metacarpal bones comminuted. The thumb was uninjured, and I amputated through the middle of the palm, pinching off the bones near the carpo-metacarpal joints. There was no skin to form a covering, and some sloughing of the soft parts has followed; but granulation has commenced, and, when it is fairly established, by transplanting on to the palm, and the surface covering the ends of the bones, I shall be able to materially hasten recovery and give a firmer, harder, more yielding substance for use. In retraction of stumps leaving bones covered with granulations only, transplantation of skin will be of great service, and will doubtless save some secondary amputations. Finally, following the example of Mr. Durham, of Guy's Hospital, by modification of skin-grafting, we shall be enabled to remove, with boldness, tumours involving the loss of much integument.

Another great benefit to be derived from transplantation is that of arresting the breaking down of large cicatrices. This has just been illustrated in the case of J. Dando, already mentioned. On November 30th, an ulcer formed in a large healed surface of thin cicatrix midway between the sound skin and the grafts. On December 2nd, I planted two portions of skin of the size of a pea upon this oblong surface. One, the lower, lived, and on December 6th, was becoming red; and had stimulated fine blue cicatrisation from the margin to cover half its surrounding ulcer; while the upper had died and ulcerated the surface on which it was planted, and was increased to fully a third larger. On this, and also on another ulcer which had formed, I planted a piece of skin of the size of a fourpenny-piece.

With regard to the source from which integument should be taken, most prefer the inner side of the upper arm; but one important feature of the operation is that it gives freedom of removal from any part or any person, and our endeavour should be to gain integument of the same consistence as that belonging to the part on which we plant it, while we are careful not to produce tension in the part from which we remove skin. But we are not confined to our patient even; an amputation giving healthy skin affords an abundant supply. Mr. Leonard and I both made use lately of this source from a leg amputated by Mr. Tibbits. Mr. Leonard's grafts took, but mine failed, owing to the unhealthy character of the ulcer—a syphilo-strumous ulcer covered with aplastic lymph. I was anxious to try skin from such a source, and scraped the lymph from several granulations; though the soil was *unsuitable*, some grafts adhered for a time, and gave assurance that they *would have* succeeded in a healthy ulcer. I have since employed healthy

skin from an amputated limb in three cases.—*British Med. Journal*, *Dec.* 10, 1870. *p.* 621.

70.—ON THE TRUE NATURE OF THE SO-CALLED SKIN-GRAFTING.

By Dr. DAVID PAGE, President of the Royal Medical Society of Edinburgh.

I am convinced that the so-called "skin-grafting" consists, in truth, not of a transplantation of true skin, but of epithelium, exactly analogous to what is occasionally observed in certain ulcers, especially in those associated with a syphilitic cachexia, where patches of delicate cuticle appear spontaneously on the surface and spread towards the circumference, but to be carefully discriminated from similar phenomena in ulcers resulting from extensive burns, for in these the apparent regeneration of skin is due to the fact that little insulated spots of true skin having escaped destruction, reappear after the first effects of the injury have been removed. These act as centres for healing action in a very different way. That the action of the transplanted portions is not merely that of affording a point of attachment (*point a' appui*) for spontaneous cicatrisation, was satisfactorily proved by a series of experiments, in which pieces of sheep's-skin, caoutchouc, and other substances, were applied to the surfaces of healthy ulcers, and then retained in the same way as the portions of skin. But they only acted as foreign bodies, and on removal I found that a destruction of the granulations and depression of surface had resulted from their pressure.

Besides the cases in which skin-grafting has proved successful, have been those in which the granulating action was healthy; for if it were weak or absent, the patches refused to adhere. The temporary disappearance of some of the transplanted pieces, noticed by at least one surgeon, is, I think, due to the varying thickness of the young epithelial layer removed.

In conclusion, I am led to believe by these results of observation that beyond a somewhat greater rapidity of cicatrisation, especially where contraction of surrounding textures is resisted either by the situation or the extent of the breach of the surface, this method of skin-grafting is of limited application; and as its results lead to no regeneration of the true skin, but merely the formation of a cicatrix in every respect identical with that formed spontaneously in the natural process of cure. It is an operation which cannot rank with plastic operations proper, and which is not likely to occupy a permanent position in minor surgery.—*British Med. Journal*, *Dec.* 17, 1870, *p.* 655.

71.—SKIN-GRAFTING.

By R. W. GOLDIE, Esq., Assistant Surgeon, Chorlton Union Hospitals, Manchester.

Eight out of ten of the ulcers met with in every-day life, when subjected to the most ordinary remedies, rapidly get well. Of these remedies I may instance the following as among the chief—viz., rest, cleanliness, and caustic. The ninth ulcer will require for its cure appliances of a more powerful description, such as strong nitric acid, strapping skilfully and carefully applied, &c., &c., in addition to internal remedies and diet suited to the constitutional requirements and general condition of the patient.

The tenth ulcer—of which class there are, happily, few—will resist every known method of treatment, although persevered with for a great number of years, under the most favourable circumstances alike for surgeon and patient. It is for cases of this last description that skin-grafting promises at present to do so much, and it is because I have under my care at the present time an ulcer whose duration, position on leg, and antecedent treatment fully warrant me in calling it an *incurable ulcer*, that I venture to submit the following particulars of the case.

Lawrence D., *aged fifty-five*, was admitted Oct. 15th, having an ulcer,

somewhat club-shaped, situated in the front and lower part of the leg, eight inches long and ranging from two to four inches in breadth. He states that he injured his leg by falling against the sharp edge of a bucket twenty-eight years ago. He was treated for this and recovered; but eight years afterwards—i.e., in 1850—he again injured his leg in the same situation, since which time, although he has been treated in many institutions, including this one, he has received but little benefit up to the present. With such a history I felt it would be but idle waste of time to try any of the usual remedies in this case, and accordingly set about procuring a healthy surface for the purpose of grafting.

On October 22nd I transplanted from the skin of the back of the upper arm three small pieces, each the size of a pea, and bound them to the granulating surface with ordinary soap plaster. Ordered water dressing during the day, and zinc ointment at night, to be applied to the uncovered portions of the ulcer, with a bandage over all.

25th. On removing the plaster, I found all three adhering; the bits of skin no longer looked white, but were of a reddish-blue colour, and elevated in the centre. Ulcer dressed as before.

In this, as in some of my other cases, no change took place for seven or eight days—the portions remaining perfectly visible in all my cases during this period—when they rapidly began to increase in circumference, the margin of the ulcer also closing in with almost equal rapidity.

At the time of writing (16th), the two lower grafts are completely merged in the surrounding cicatrix; the upper one has increased to the size of a florin, and is united in one part to the surrounding new skin; the remainder of the circumference and the margin of the ulcer are almost united.

I may here state that I have of late abandoned the use of scissors, and now employ dressing forceps and bistoury in procuring the grafts. The bistoury cuts more quickly and accurately, therefore less painfully. In my first case I bound the graft on with collodion; this proved useless, as graft and collodion were floated off by the discharge in twenty-four hours.

In conclusion, the value of Reverdin's discovery does not alone lie in enabling the surgeon to cure what have hitherto proved incurable ulcers, but also in curing them with unprecedented speed.—*Lancet, Jan.* 14, 1871, *p.* 46.

72.—ON THE TREATMENT OF ECZEMA.

By Erasmus Wilson, Esq., F.R.S., Professor of Dermatology at the Royal College of Surgeons of England.

In reference to treatment, eczema must be regarded as a "solution of continuity," and as such requires a dressing to defend the lesion, for the purpose of keeping its broken edges in contact, and of excluding the operation of external irritants of every kind. A dressing with the benzoated ointment of oxide of zinc fulfils this indication completely. The ointment should, in the first instance, be smeared upon the eczema; the smearing process should be repeated twice or more frequently in the day, so as to secure a permanent covering; and, wherever practicable, strips of linen rag spread with the same ointment may be placed over the eruption and maintained in a position by a roller, so as to keep the ointment and the dressing in permanent contact with the diseased skin. In this relation the ointment fulfils the purpose of a light unirritating plaster; it preserves the natural moisture of the skin, and excludes the stimulant operation of the atmospheric air. It is easily replaced when accidentally removed, and in many cases will accomplish every object of treatment from the beginning to the cure of the case. Let me instance an eczema infantile, in which the body is covered with eruption from head to foot; it is hardly possible to conceive a remedy more admirably suited in such a case to meet the exigencies of treatment than the benzoated ointment of oxide of zinc.

It has long been my custom to combine with the zinc-ointment a small

quantity of spirits of wine, in the proportion of one drachm to the ounce; the spirit softens the ointment and facilitates its application; it produces a sensation of coolness which is agreeable to the heated surface, and it has besides a gently stimulant effect on the nerves of the skin. The application, as I have already observed, relieves the heat, the stiffness, and the itching, and the relief continues until the ointment dries up or is accidentally removed. When either of these events takes place, the ointment must be repeated in the same manner as before. Our aim should be to favour a thin deposit or concretion on the surface, which should occupy the place of the broken or exorciated epidermis; such a deposit or concretion is, in fact, an artificial cuticle, a kind of natural plaster, under which the skin is preserved in a state of repose, and the inflamed and irritable tissues have time given them to recover their normal status. You will perceive that eczema brings before us a surgical lesion in which the application of a plaster or dressing of any kind is often perfectly impracticable, and therefore we are obliged to have recourse to a remedy which shall possess the intrinsic property of adhesion to the skin without the aid of other coverings. This will explain our anxiety to have the inflamed surface thoroughly coated with the ointment, and to have the ointment repeated as often as, from any accident, it may by chance be displaced; and, of course, wherever practicable, means may be contrived, such as bandages and compresses, to render the dressing permanent. Above all, it is important to avoid washing the skin at this stage of the disease; washing would remove the ointment and open up the excoriation afresh; it would be undoing that which it had taken much labour to do; it would be unsurgical, by creating disturbance where rest and position were of the utmost importance. There can be no want of cleanliness where a pure oxide of zinc ointment is properly used; and if secretions be poured out from the skin, they may always be absorbed by means of a soft napkin, and, together with crusts, may be gently wiped away. Mothers will sometimes hear with wonder the command to avoid washing their children in a case of eczema infantile; but they are generally ready to admit that the eruption is always more uneasy after the washing than it was before, and their instinct quickly assures them that their instructions to avoid washing are correct.

Eczema enjoys the peculiarity of presenting, in a general attack of the eruption, a variety of degrees or forms of manifestations on different parts of the body; thus it may be erythematous in one place, ichorous in a second, and squamous in a third. The zinc-ointment is equal to the relief of every one of the forms of the eruption; but it not unfrequently happens that we may find an advantage in using a powder in one situation, the lime-water and zinc-lotion in a second, and the ointment in a third. And in the adoption of these means we are to be influenced rather by the sensations of the patient than by any preconceived theory of the disease. In general terms, it may be said that whatever gives rise to pain or uneasiness is bad, and will require to be changed.

Eczema is essentially chronic as to its course; but it manifests stages in its progress which are as decidedly acute. The treatment which we have just been considering is strictly palliative, and is therefore especially adapted for the early and acute stages and acute manifestations of the disease, but is equally applicable for the relief of heat, itching, and dryness, in every stage of the affection. If I were asked how I should distinguish between an acute and a chronic eczema, I should say that the acute stage was denoted by erythematous congestion and moist excoriation, and the chronic stage by infiltration and desquamation, the infiltration giving rise to thickening and induration. I shall now suppose that the eczema has reached its dry, squamous, thickened, and indurated stage. It has assumed that condition which, in ulcers, for example, is termed indolent, inveterate and so forth. The zinc-ointment removes the scales, heals chaps and fissures, and relieves in some degree the itching, but does nothing towards the dispersion of the thickening and induration of the tissues—that is, towards the cure of the disease. The time, in fact, has come when we must contrive to awaken the tissues *from their indolence* and lethargy, and direct, as far as we are

able, the newly awakened life towards a normal state of action—that is, towards a restoration of healthy function and tone.

Our purpose, therefore, is no longer palliative; it is stimulant or tonic; the palliative treatment has accomplished all that it can; now we have to consider the nature and mode of application of the stimulant treatment. Our stimulants possess a great range of power, and, if we knew exactly the amount of resistance which we should meet, we might apportion our power with exact accuracy. But as this can never be the case in dealing with so delicate a machine as living organisation, the laws of surgery would prescribe to us that we should begin with the mildest of our stimulants and advance progressively and to the best of our judgment to the higher degrees. The philosophic surgeon will not hesitate to adopt this course as one in every way consistent with his knowledge of vital phenomena; and, therefore, we may proceed to inquire, In what do our stimulants consist?

The first and best of our tissue-tonics or local stimulant remedies is undoubtedly soap. It will be remembered that I have prohibited soap in the earlier and acute stages of eruption; therefore soap is new to the morbid skin, and capable, consequently, of producing a more powerful effect than would otherwise be the case. The chronic eczema should be thoroughly washed with soap, combining with the solvent action of the soap upon the epithelium such an amount of moderate friction and compression as may reach the vascular and the infiltrated tissues. After the washing, the surface is to be dried with a soft napkin, and, as soon as dried, dressed with the zinc-ointment like an eczema of an earlier period. The next day we examine very carefully our eruption, and, if we find no signs of excessive irritation present, we renew the saponaceous washing, and repeat it again and again until the eczema is healed. It will soon be apparent how frequently the process may be repeated, whether once a day only or twice, or whether the reapplication must be deferred for several days. The immediate consequence of the stimulant treatment will probably be the development of an exudation on the surface, which will relieve the infiltration and turgesence within; and a few repetitions of this exudation will so far tend to empty the tissues of their excess of fluids that they will be enabled to return by degrees to their normal state.

This, in fact, is the explanation of the *modus operandi* of the powerful stimulants which we hear of as being from time to time useful in the cure of chronic eczema; such as strong alkaline soaps, strong solutions of potash, strong mercurial ointments, strong solutions of nitrate of silver and tar. And, in illustration of the same principle, I may call your attention to a remark which I made in reference to the treatment of No. 27; namely, that, after an obstinate resistance of a variety of remedies, the disease was suddenly cured by one application of the tincture of croton, pencilled over the inflamed surface.

If I wished to reduce the principle of local treatment to an aphorism, I might do so by the use of the two words *palliative* and *stimulant*. Among the palliatives, there is one which is occasionally of much service for the relief of heat, tension, and pruritus; namely, water-dressing, whether the moist application be made in the ordinary way with an impermeable covering, or employed in the shape of a cold starch-poultice. The water-dressing may be used constantly for a period, or during the night only; and its use may be combined with that of the lime-water lotion, zinc-ointment, or saponaceous frictions and ablutions. The water-dressing is very useful in accelerating the separation and removal of crusts, in promoting exudation from infiltrated and œdematous tissues, and in preparing the tender skin for the treatment by ointment or the treatment by desiccating lotions. If a water-dressing had been kept applied to the leg in Case 47 for twenty-four hours, the whole of the dark crust visible in the model might have been washed away. The morbid skin would then have been prepared to receive the dressing of zinc-ointment; and this, with the support and moderate pressure of a properly adjusted roller, would have effected a vast improvement in the disease in a very short space of time.

One symptom which more than any other torments both the surgeon and the patient in eczema is *pruritus*; and very frequently we are called upon to change our plan of treatment in order to combat this annoyance. When the pruritus proceeds from ordinary irritation, it may be subdued by the oxide of zinc-ointment; and a moderate friction with this ointment may be had recourse to as often as the itching returns. If allowed to continue, the pruritus will sometimes assume a neurotic and neuralgic character. It will come on after any slight exertion, after the taking of food, upon changes of temperature, and especially at night, sometimes on first assuming the reclining posture, and at other times in the early morning. It is always intermittent, and presents such a variety of manifestation as to make evident that sometimes the peripheral nervous plexuses are the seat of the painful sensation, sometimes the perforating twigs of the cutaneous nerves, and sometimes the larger branches and even the trunks of the nerves. There may be a gradual transition from a feeble itching to a pruritus which vibrates through the whole nervous system, or to a state of neuralgic pain such as has suggested the term eczema neurosum.

When the zinc-ointment, with the addition of spirits of wine, camphor, tannic acid or carbolic acid, fails to relieve the pruritus, we may sometimes meet with help from hot water, from a cold starch-poultice, from water-dressing; from lotions of soda, hydrocyanic acid, juniper tar, or a solution of nitrate of silver. But all these remedies must be regarded simply in the light of adjuvants to the principle of treatment already discussed; and, when the neuralgia is decided, we must seek for relief in constitutional means.

The stavesacre ointment is often very successful in the relief of the pruritus which sometimes follows scabies; and as this remedy, next to sulphur ointment, is one of our best means of destruction of the acarus, it may possibly happen that the pruritus is protracted by some such overlooked and unlooked-for complication. The pruritus of lichen urticatus is best relieved by Hebra's lotion—a lotion consisting of an ounce each of soft soap, juniper tar, and alcohol, diluted with five ounces of water. And the sometimes ungovernable itching of lichen planus is with the most certainty mitigated with hydrocyanic acid suspended in an emulsion of bitter almonds.

Another modification of the local treatment of eczema is the natural consequence of its seat. Neither powder, nor lime-water lotion, nor zinc-ointment, would be suitable for application to the eyelids, or within the meatus aurium; but for both these regions an excellent substitute will be found in an extremely diluted nitrate of mercury ointment, or in the glycerine of tannic acid of the *British Pharmacopœia*. Again, the oxide of zinc-ointment is unsuitable on the scalp, in consequence of clogging the hair, and thereby giving rise to much inconvenience; but, in the latter situation, a far better remedy presents itself—namely, the nitric oxide of mercury ointment, diluted with benzoated lard in the proportion of one part to three of the diluent. The case of dermatitis exfoliativa (No. 6), suggestive of an extensive burn, was most efficiently relieved by the linimentum calcis and the carron-oil.—*British Med. Journal, March* 25, 1871, *p.* 303.

73.—ON ECZEMA IN CHILDREN.

By Erasmus Wilson, Esq., F.R.S., Professor of Dermatology in the Royal College of Surgeons.

It is important to remember that eczema prevails at every period of life, from infancy to extreme old age, and, consequently, that the treatment will be very much influenced by the age and constitution of the patient. As a general expression, it may be stated that the eczematous affections take their origin in lowered vitality or debility, and that the aim of our treatment should be—to restore health. But the conditions of debility necessarily vary at different periods of existence. In infancy and childhood, the cause of debility will be defective nutrition or defective nutritive power; in the adult and at middle age, the cause will very probably be malassimilation from de-

rangement of the digestive functions; while in old age and in certain adults of highly nervous temperament, the cause of eczema will be a malassimilation determined by irritability and waste.

Thus, with a patient before us suffering under eczema infantile, we must inquire carefully into the diet of the child: it has probably failed to obtain its natural food, and recourse has been had to bringing it up by hand. Then we must draw on our resources bearing upon the nutrition of infancy—the substitutes for mother's milk, the wheaten flour, the beef-tea, the cod-liver oil; in such a case the best nurse will prove to be the best physician. A similar principle of treatment carries us through the whole of the nutritive period of life from infancy until the full development of the body is perfected by growth. We may find many intercurrent sources of debility intruding upon the steadfast stream of our course; but our aim should always be to perfect, as far as we are able, by diet, by hygienic measures, and by medicines, the healthy nutrition and development of the organisation. We may be interrupted by the successive trials of vaccination, of teething, of infantile diseases, of scanty or deficient food, of growth; but we must be ready to appreciate every condition predisposing to exhaustion, and apply in good season and judiciously the appropriate remedy.

If the powers of constitution of our patient be equal to the proper digestion and proper assimilation of the improved diet, our purpose is accomplished, the cure is certain and rapid; but the nutritive power may be weak, in which case it will be necessary to find some means of giving it strength. Such a means we possess in arsenic combined with iron; and there is no medicine more harmless, more certain in its effect, and more successful, than arsenic. The dose for an infant of a month or six weeks old may be one minim of Fowler's solution, equal to the $\frac{1}{120}$ of a grain of arsenious acid—a dose far too minute to do harm, although capable of doing wonders in the way of good; and we may in the course of a few days increase the dose to a minim and a half or two minims. I have for many years prescribed arsenic in a combination, which I have found so safe, so efficacious, and so convenient, that I have been unwilling either to vary the remedy or the formula. The latter is as follows.

℞. Vini ferri ℥ iss; syrupi simplicis ʒ iij; liquoris arsenicalis ʒ j; aquæ anethi ℥ ij. Misce. One drachm, with meals, three times a day.

Let me recapitulate: firstly, we should cover every visible part of the eruption, whatever its state, and avoiding only the hairy scalp, with the benzoated zinc-ointment in combination with spirits of wine; secondly, we should examine carefully into the diet, and direct such a regimen as in our opinion is most likely to be nutritive; and thirdly, we should administer from one to two minims of Fowler's solution in the combination already mentioned, three times in the day, with the single condition that the medicine should be given on a full stomach, and stopped immediately if it chance to disagree. Two other points, but of secondary importance, follow upon this course of treatment. It is well to see that the bowels act regularly. With an unsuitable diet it is hardly probable that digestion will be complete; but nothing short of constipation need delay the commencement of the curative treatment.

The other point opens up a question as to the derivative influence of eczema: that it is derivative in infancy is more than improbable, and I should no more hesitate to arrest an ichorous discharge from the skin than I should a chronic diarrhœa from the intestinal canal. Nevertheless, it is always wise to be on our guard; and if any apparent inconvenience arise from the sudden closure of the outlet through the skin, it might immediately be removed by the administration of one grain of calomel with one grain of sugar, dropped into the mouth or upon the tongue.

The usual issue of the treatment now mentioned is a speedy and effectual cure; and very rarely, indeed, have I met with a chronic prolongation of the disease, and even more rarely with a fatal termination of the case *Whenever the* latter has occurred, it has resulted from bronchitis or *convulsions.* Bronchitis is intimately associated with eczema—in fact, is

neither more nor less than an eczema of the bronchial mucous membrane, and of course has its dangers; whereas convulsions may seize on the delicate organisation of infancy, excited by a very trivial cause, such as mere indigestion or the cutting of a tooth, and cannot therefore be regarded as a direct consequence of eczema. On the contrary, it may be reasonably predicted that convulsions would be less likely to attack an eczematous child than one in apparent good health.

In eczema, as it occurs at the age of childhood, and thence upwards to early manhood, the principle of constitutional management already described, namely, the restoration of power by diet, by hygienic measures, and by tonic remedies, may be regarded as the universal plan of treatment and unfailing in its results.—*British Med. Journal, April* 1, 1871, *p.* 332.

74.—ON THE USE OF THE ECRASEUR FOR THE REMOVAL OF NÆVOID GROWTHS.

By James F. West, Esq., Senior-Surgeon to the Queen's Hospital, and Professor of Anatomy in Queen's College, Birmingham.

[Mr. West has been in the habit of using the ligature, chloride of zinc paste, or injection of perchloride of iron for many years, until he met with a case in which the ligature failing entirely he was induced to try the écraseur.]

The destruction of nævi by caustics is attended by uncertain results, and the consequent cicatrices are often deep and ugly, from the impossibility of our gauging the distance to which the caustics—as chloride of zinc, nitric acid, &c.—ought to penetrate the tissues.

The ablation of erectile tumours is probably the most perfectly reliable means of treatment, and this may be accomplished either by enucleation, the ligature, the knife, or the écraseur.

Piecemeal excision or enucleation is often attended with great loss of blood, even where the adjacent arterial trunks have been compressed as completely as possible; and the little patients who are the ordinary subjects of nævi bear hemorrhage badly. A comparatively trifling loss often proves so serious to the patient that the attacking of large subcutaneous nævi by this process would hardly be justifiable.

The same difficulty meets us in the use of the knife; and I cannot doubt that the older surgeons were just in laying it down as a rule that, in removing nævi, it was always proper to cut wide of the tumour, and on no account to cut into its mass.

The introduction of either hare-lip pins or of ligatures frequently fails to cure; the latter are especially unreliable with venous nævi of large size, owing to their becoming loose, even though the skin around the growths may not have been included in them. The parts daily diminish in size, so that ligatures have to be again and again applied to ensure the entire destruction of the tumour. Moreover, ligatures often set up troublesome ulceration at the base of the nævi, from which occasionally severe hemorrhage takes place.

The advantages which, in my experience, the écraseur offers are, that hemorrhage is avoided—an important element in all operations, but particularly so with children, and that you have a linear cicatrix and a comparatively small wound; and thereby prevent or diminish the deformity which, by other operative procedures, will almost of necessity be produced. Chassaignac, also, claims for it that less inflammatory action and less suppuration attend its use than that of the knife; and, consequently, that the wounds resulting therefrom heal more readily, and are less likely to be followed by pyæmia. On these latter points I will not now offer an opinion; but as to the smallness of the resulting cicatrix—a great desideratum in all operations about the face,—and as to the freedom from hemorrhage, even when dealing with large growths of this kind, I am quite decided.

Case 1.—Mrs. L.'s child, aged seven months, had a purple subcutaneous nævus, as broad as a crown-piece, on the left side of the head, which, when filled with blood, was elevated to the size of a large walnut. Pressure with elastic pad had been tried, but without success, when Dr. Suffield, the ordinary medical attendant, asked me to see the case. I ligatured the tumour in four segments on Nov. 11th, 1868; but owing to the ligatures becoming loose, very little reduction in the size of the tumour took place. On the 18th I encircled the base of the nævus with a ligature. On the 22nd I introduced two strong pieces of whipcord through the centre of the tumour, and tied it in two segments. These also became slack; and very little benefit having been obtained, I resolved on using the écraseur. Having passed two hare-lip pins through the base of the tumour, I applied the chain of the écraseur below them, and gradually working the handle of the instrument every twenty seconds, succeeded in removing the whole mass, which was as large as a walnut, in the course of fifteen minutes. No bleeding of consequence occurred, the wound healed up rapidly, and a very small cicatrix, which was perfectly free from all trace of nævoid tissue, resulted.

Case 2.—Elizabeth L., aged forty-seven, was admitted into the Queen's Hospital on April 26th, 1869, with a dark pigmentary nævus on the right cheek which had existed from birth, but had recently increased greatly in size, and which reached from the outer canthus to the angle of the jaw, and measured two inches and a half in length by one in breadth. I removed it with the écraseur the same day, first making an incision through the skin around the tumour to the depth of a quarter of an inch, in which the chain of the instrument might lie. This procedure facilitates the operation, as the écraseur, though it freely divides mucous membrane, rather tends to tear the integument, and is at any rate some time in cutting through it. Three silver sutures were introduced after the operation. These were taken out on May the 1st, and two days after, the wound being perfectly healed, she went home, having a very small linear scar on her cheek.

Case 3.—Mrs. B., of Bromsgrove, came to me with a strawberry-like pigmentary nævus as large as a chesnut on the left cheek, just below the zygoma. Dr. Mackey, Professor of Materia Medica in Queen's College, gave chloroform, and I applied the écraseur, first making a slight incision in the skin and around the tumour as in the former case. Scarcely any blood was lost by either patient. Three silver sutures were introduced, which were taken out on the fourth day, and on the seventh day after the operation she was able to return home. This growth also had existed from birth as a mole, but had lately developed greatly and become very vascular and sensitive. The cicatrix which resulted was linear, and was so slight that when she presented herself in my consulting room a few months after, I did not at first distinguish it at all.—*Lancet, March* 4, 1871, *p.* 303.

75.—ON THE TREATMENT OF CARBUNCLE.

By Dr. J. Murray, M.A., Wickham, Hants.

[The usual treatment of carbuncle by free incisions, although in some cases productive of relief, is not in the majority of cases satisfactory. Many surgeons prefer to abstain from all operative interference.]

About five years ago I was accidentally led to adopt a plan of treatment new, so far as I am aware, and free from all the objections to which incision is open, but which expedites in a very remarkable degree the process of recovery.

Case 1.—12th June, 1865. I was consulted for the first time by an unmarried lady, 36 years of age, of good constitution, but nervous temperament, *and much* exhausted by pain and sleeplessness, due to fissured anus, symptoms of which had appeared three months previously. For three days se-

vere pain had also been felt within the vulva, and on the mucous surface of left labium a carbuncle about an inch and a quarter in diameter was found. From its whole area the mucous layer had peeled off, leaving a smooth shining surface of a livid colour, surrounded by the ordinary halo of reactionary inflammation. With the certain prospect of one cutting operation, incision of the carbuncle was so strongly objected to that I determined instead to imitate the ordinary procedure by dividing the tissues with potassa fusa. Accordingly, with a sharp-pointed piece I crossed the surface very lightly, intending to complete the process next day, when the amount of destruction produced by the first application had been ascertained. In order to prevent all further escharotic action, the parts were freely sponged with dilute vinegar, and a fold of oiled lint was then introduced between the labia.

13th. The vulvar pain rapidly diminished after the application of the caustic, and is now quite gone. All swelling has disappeared, and the site of the carbuncle is only marked by a bright-coloured patch of surface three quarters of an inch in diameter, crossed by two shallow linear depressions.

15th. There has been no further discomfort due to the carbuncle, and no perceptible trace of it remains. Sphincter ani incised.

Case 2.—5th August, 1865. J. P., labourer, aged 33, flabby and ill fed, has had, for ten days, a painful swelling at the back of his neck, and during the last week this has rendered him unable to work. Extending downwards from the roots of the hair in the middle line, there is now a carbuncle four inches in diameter, boggy, and surrounded by little inflammation. Its surface is studded with openings of various sizes, occupied by grey sloughs, and exuding their sanious pus. This is now scored crucially with potassa fusa, a superficial eschar in each direction being produced. Linseed poultice ordered.

6th. The area of swelling has diminished by nearly one-half, most of the sloughs have separated, and the corresponding openings have assumed a healthy aspect.

7th. No sloughs now remain, the general surface looks comparatively healthy, and the openings are rapidly healing. To apply water-dressing. Resumes work.

12th. There are still a little redness and induration, but no traces of caustic action are perceptible.

Up to the present time I have treated all my cases of carbuncle in the same way, and with such uniformly similar results that it would be unnecessarily tedious to give details of each. I shall therefore pass over the next ten of the series, and confine myself to describing the last three, which are representative of the disease in its various stages, and illustrate well the usual progress under treatment. Case 13 was a favourable one for observation, and I delayed interfering until the patient's welfare became endangered.

Case 13.—20th July, 1870. S. M., aged 21, has for two years had disease of the right hip-joint. Partial anchylosis has taken place, but large chronic abscesses have formed over lumbar and sacral regions. Until quite recently, however, he has been able to take exercise upon crutches, with the additional support of a gutta percha splint. Three days ago he found he could not apply the splint in consequence of the appearance of a painful pimple over trochanter major. A carbuncular swelling, half-an-inch in diameter, is found to have developed itself, and this he is ordered to dress with benzoated lard, merely in order to prevent irritation by friction of clothing.

25th. The area of furuncular inflammation has steadily increased, and now there is over the trochanter and its immediate neighbourhood, a tense circular swelling nine inches in diameter, the centre of which is occupied by a carbuncle four inches across. The latter is apparently rather more than an inch in thickness, and the epidermis has peeled off, leaving a livid shining surface perforated by numerous small holes, from which clear serum exudes, and in each of which can be seen the white tip of a core. Surrounding this is a livid and brawny halo. No sleep has been obtained for two

nights, and patient is becoming exhausted. Potassa fusa applied in the usual manner.

26th. 10 a.m. Pain rapidly diminished after caustic was employed and a good night's rest was had without taking an optional dose of chloral hydrate. During the night a serious discharge, sufficiently profuse to saturate several folds of sheeting and penetrate to the bed beneath, proceeded from the carbuncle. On examination the potash scores are found to be the source of this. The surface of carbuncle has assumed a healthy red colour, and its diameter is reduced to two inches. Two narrow grooves at right angles to each other, with pale granulating surfaces and pink healthy margins, represent the results of caustic action.

28th. No trace of carbuncle, except a slight superficial blush remains. Patient is able to re-apply splint and use his crutches.

3d Aug. For two or three days some discomfort has been felt, and now there is over trochanter a superficial ulcer about an inch in diameter, and of healthy appearance, probably due to premature application of splint.

8th. Ulcer has quite healed.

Case 14.—15th Aug., 1871. A. W. Page, aged 17, has a furuncular swelling on chin, an inch in length and a half an inch in breadth. It first appeared four or five days ago, and has since been gradually increasing in size. Potassa fusa applied.

20th. The pain and swelling rapidly diminished, and now there is no trace either of tumour or eschars.

Case 15th.—12th Oct., 1870. J. W., aged 55, labourer. During the last ten days has had a painful swelling over patellar tendon, which has rapidly increased and now prevents his walking. This consists of a carbuncle in the boggy stage, three inches in diameter, with a large slough in the centre, and small suppurating openings over its surface. Considerable reactionary inflammation surrounds it, and both leg and foot are œdematous. Potassa fusa applied.

22d. Œdema and inflammation have subsided and slough has separated. In the site of the latter locality granulation is taking place. Intends to resume work to-morrow.

At an early period I mentioned the matter to my friend Mr. Pater, Hants County Lunatic Asylum, who gives me the results of his experience as follows:—

"During the last four years all the cases of carbuncle occurring in this asylum—about 20 in number—have been treated by forming superficial eschars by means of potassa fusa, and with uniformly satisfactory results. In cases where sloughing has not already set in, resolution takes place without suppuration; and in more advanced cases healthy suppuration is rapidly established, and speedy separation of sloughs takes place."

Incision in carbuncle is generally, I think, advocated upon grounds which imply a mistake as to the pathological conditions present. The professed object is to relieve tension and give exit to sloughs. Now, the tension is chiefly due to the cores or plugs contained in the meshes of the corium, and therefore interstitial, so that only the tissues immediately divided can be relieved by incision. Again, no sloughing occurs until, as in other cases, the inflammatory action has been so severe as to produce mortification. The core has nothing in common with sloughing cellular tissue as is taught in some surgical text-books. It is simply a fibrinous coagulum, the product of inflammation going on in the surrounding cellular tissue. In what manner these conditions are altered by the caustic action it is impossible precisely to say; but in some way or other the nutrition is so modified that the inflammation subsides and the cores are re-absorbed. Dr. H. Blanc has observed analogous effects in diffuse cellulitis.—*Glas. Med. Journal, Nov.* 1870, *p.* 66.

76.—ON THE TREATMENT OF CARBUNCLES.

By Dr. William Marcet, London.

The first sign of a carbuncle is usually denoted by a sensation similar to that produced by a slight prick with a pin, occurring when the hand is passed over the effected part. Nothing may be seen yet on the skin, but some few hours later a small vesicle appears, when the pain becomes more acute, and may be caused by the mere contact of the clothes. If the carbuncle be allowed to proceed, say, for twelve hours beyond its very first appearance, it will run its usual course: but its progress may be arrested by the early destruction of the vesicle and its contents by means of the cauterising action of heat. I have adopted many plans to effect this purpose; but the simplest of all, and one which may be considered as always at hand, is the use of an incandescent lucifer match. The vesicle is to be merely touched, for a fraction of a second, with the red-hot point from five to seven or eight times in succession, when it assumes a dull-whitish appearance from the coagulation of the albumen it contains. The end of a hot wire may also be used. The pain of the operation is really trifling, and it will save from a week to a fortnight's suffering. I have repeatedly applied this form of actual cautery to myself, and shall not hesitate to do so again if necessary.

In general, within four or five hours after the operation, the pain from the incipient carbuncle has in a great measure disappeared, and there is an end to it. It may happen, however, that the carbuncle, at its origin, is deep under the surface of the skin, when no vesicle appears. I have not been so successful with the use of the actual cautery in these cases as in the others; but, probably, had the cauterisation been carried deeper, the mischief might have been arrested.

The present treatment suggested itself to me from a consideration of the nature of the vesicle which precedes a carbuncle. This vesicle appeared to me to contain a virus, which was the real cause of the subsequent inflammation, and I concluded that by destroying this virus the carbuncle might be "nipped in the bud." I have tried the local application of nitrate of silver and nitric acid, but they cannot be relied upon, and I fully believe that nothing will act so satisfactorily as the cauterising action of heat.

I may observe that, for the treatment to be successful, it should be applied as soon as possible after the first appearance of the carbuncle. The progress of boils in this country could probably be arrested in the same way, and it might be worth the while to try whether Indian boils might be cured by the present means.

[Our plan is to take up a fold of skin and nick the vesicle, taking care to cut well through the base, and when deep under the skin turning out with the back of the bistoury the small pellet of matter which there exists. The spot should then be covered with a morsel of lint soaked in blood, and over that a piece of plaster to retain it in position.—Eds. Retrospect.] —*Lancet*, *Jan.* 14, 1871, *p.* 45.

SYPHILITIC AFFECTIONS.

77.—GONORRHŒA TREATED BY TANNIN AND GLYCERINE.

Dr. Schuster of Aix-la-Chapelle describes, in Pick and Auspitz's *Archiv f. Dermatologie und Syphilis*, a method of treating gonorrhœa and gleet, to which he was lead by observing the results of a similar plan in uterine catarrh. Tannin, when mixed with glycerine, forms a waxy mass, which soon becomes smooth, hard, and brown, but readily dissolves under a gentle heat. Dr. Schuster has made rods, three or four inches long, consisting of tannic acid 2 parts, powdered opium 0.12 part, with a sufficiency of glycerine. These are soft in the summer, but become very brittle in the winter. The rod, moistened with hot water, is introduced into the urethra,

and a piece about an inch and a half long is left in: it melts down and forms a whitish mass with the mucous secretion of the canal. The rod may, after remaining from five to ten minutes, either be removed by the finger or be expelled by the stream of urine. The remedy is applied twice or thrice daily. Dr. Schuster treats gonorrhœa in all its stages in this way; a cure follows in a period varying from seven to eighteen days.—*British Medical Journal*, *Jan.* 14, 1871, *p.* 39.

78.—TREATMENT OF GONORRHŒA BY INJECTIONS OF PERMANGANATE OF POTASH.

By Dr. W. MACFIE CAMPBELL, House Surgeon, Seamen's Hospital, *Dreadnought*.

[The writer, in the following short article, contrasts the results of treatment by injections of permanganate of potash with those of other modes of treatment employed during the two preceding months.]

In sixteen cases treated in this way, there have been ten cures at periods of from two to ten days, and six cases discharged as convalescents, they feeling well enough to leave hospital, but not being such as I could class as cures. Thirty-one cases in all were treated in hospital, with the results which I can most readily show in the following table:

No. of cases treated.	Treatment employed.	Average length of stay in hospital.	Cases cured.	Cases convalescent.	Average time of cure.	Average duration of disease before
6	Cubebs and copaiba	12 days.	4	2	13 days.	5 days.
2	Condy's injections, two drachms to the pint.	9 ,,	1	1	8 ,,	9 ,,
3	Tincture of muriate of iron internally	8 ,,	1	2	10 ,,	214 ,,
3	Sandal wood	13 ,,	1	2	8 ,,	74 ,,
1	Soluble bougie of gallic acid	5 ,,	..	1	..	150 ,,
16	Permang. of potash injections, 5 grs. to the ounce	6 ,,	10	6	5 ,,	45 ,,

These figures, I think, compare very favourably. It may be observed that the injection of permanganate of potash is useful both in acute and chronic cases, but yields the palm to the iron treatment for very old gleets; while copaiba and cubebs are useful in acute, but quite useless in chronic cases, and even in acute cases taking more than twice the time for cure. The injections of Condy's solution and water, as generally employed, are too weak to do much good. Soluble bougies of gallic acid I have only used in one case, which of course, cannot be argued from; but are worthy of more trial. The injection I employ generally is of five grains of the permanganate to the ounce of water; six to ten grains I have also used, but with no additional advantage. Only two patients have complained of pain during the use of the injection, and that was easily stopped by omitting its use for one day. In the ten-grain cases there was no complaint at all. I may add that the patient is better to be kept in bed, and should continue the injection for at least a week after apparent cure.

These results are, I submit, quite sufficient to induce a trial of this treatment. The patient's stomach is not put out of order by nauseous drugs, and few patients would grudge the time necessary (four times a day) for so pleasant a cure.—*Lancet*, *Jan.* 14, 1871, *p.* 73.

79.—PERMANGANATE OF POTASH IN THE TREATMENT OF GONORRHŒA AND GLEET.

By Dr. THOMAS WARDEN, Royal Naval Hospital at Haulbowline.

[Dr. Warden's belief is that gonorrhœa and gleet may be cured in a couple of days by the permanganate of potash treatment, although from the rarity of gonorrhœa in the Mediterranean he is unable to adduce any considerable number of cases to prove it.]

On the sick list of the *Hibernia* I found a marine who had been under treatment for twenty days, which consisted in pursuing the recognised plan of giving salines, copaiba, and injections of different strengths, and substances, with the usual results in these tedious cases, where the constitution is beginning to suffer from the long-continued discharge and confinement. This case was really becoming an opprobrium, and we felt anything but satisfied with our treatment. I decided then on trying the permanganate of potash, which I tentatively gave in five grains to the ounce as an injection at least four times a day. This gave rise to no pain or other inconvenience. Since then I have administered it in as many as fifteen grains to the ounce. The result in this case was that the man was well in two days, or after about eight injections.

In the course of a fortnight this man went on leave, and came back with gonorrhœa. The same treatment was pursued, with a precisely similar result. I prescribed it also in the case of an officer who had had the disease for six weeks. The discharge in this case was more gleety, and his health was beginning to suffer. On this occasion the cure took six days, but I do not think he attended fully to the directions I gave him; neither was he regular in its use.

I regret that this is all the evidence I can bring of the good effects of the permanganate; but I see it is needless for me to wait for more cases, so I place this imperfect experiment before the profession. I do not vaunt these cases as being conclusive, because their paucity will hardly warrant me in claiming for this remedy the name of specific; but I bring them forward in order that those who have more opportunities of treating the disease may be tempted to try the permanganate; and I hope the results will be as satisfactory in their practice as they have been in my three cases. From what I have seen of its action, I feel very sanguine concerning its efficiency. I only ask that those who make use of it will be kind enough to publish their cases, whether attended by success or the reverse.

Now a few words may be necessary as to the method of using the injection. It must be remembered that the permanganate of potash loses its virtue by admixture with any extraneous matter, or exposure; therefore it is advisable to mix the injection immediately before using it. This ought to be done in either a glass or porcelain dish, perfectly free from any greasy matter; and the syringe must be in a like state of purity. If care be not taken in its use the patient's linen will be stained; and this should be remembered in private practice.—*Lancet*, *Dec.* 3, 1870, *p.* 779.

MIDWIFERY,

AND THE DISEASES OF WOMEN AND CHILDREN.

80.—PRACTICE IN THE PREDICTION OF THE DAY OF CONFINEMENT.

By Dr. J. MATTHEWS DUNCAN, Edinburgh.

[The end of last menstruation is generally taken as the point to count from, in calculating the duration of pregnancy; but this mode of calculation is purely empirical.]

In my former papers, which form part of my work on Fecundity, I use the great recorded experiences of Merriman and Reid. Estimating by these, I find that the 278th day after the end of last menses is the average day of delivery at the full time; and on this I proceed. No ingenuity can devise a superior plan of estimating, so long as the last menstruation forms the only generally available *terminus a quo*. The introduction by many authors of scientific views into the question of the best way of predicting the day of confinement, may be justly characterized as either at least unnecessary or else merely pedantic. Till I find a larger and more carefully compiled mass of facts than those of Reid and Merriman, I shall adhere to my method of calculating based on the circumstance that 278 days is the average interval between menstruation and parturition; and in doing so I have science and common sense on my side.

The method which I recommend is confessedly a rough one. The calculation itself is always what is called a rough one. My method certainly is loose and erroneous to the extent of one day in certain cases, which I have specified at page 340 of the first edition of my work on Fecundity already referred to. The plan is simply as follows:—Find the day on which the female ceased to menstruate, or the first day of being what she calls "well." Take that day nine months forwards as 275 days, unless February is included, in which case it is taken as 273 days. To this add 3 days in the former case, or five if February is in the count, to make up the 278. This operation is perfectly simple, and so easy of performance as to render a periodoscope quite useless.

Now, any practitioner can test this plan by his own experience, in a purely synthetical and reverse manner. He can try the plan, and then see how it has led him; whether it has led him and his patients into error or not. Since I adopted this reverse method of verifying my plan of calculation, I have found that Ahlfeld had already resorted to a similar test. It is only very slightly different from the method by which the plan of calculating was developed. The difference is stated as follows:—Cases of delivery collated yield results on which the plan is founded: instances of prediction compared with the real events test the plan.

I shall now show what my predictions on this plan have come to. No one can hope to be an absolutely good prophet in this matter, but we can be as good as possible, as nearly right as may be. The predictions to which I shall immediately make reference were all written down before the events, and remain written. I have only 153 cases to refer to, all collected within several recent years. They are few, because I did not venture on the written-down prediction unless I was satisfied that I got good information as to the day of the cessation of the menses.

I need scarcely repeat, that in practice I do not predict a day, but a week. I predicted a day in my note-book for my own use. These 153 predictions in my note-book I now analyze.

In 10 cases the day of confinement was exactly predicted, or about once in every fifteen cases.

In 80 cases the confinement took place sooner than was predicted. The number of days of anticipation was, for the whole 80 cases, 590, or an average of above 8 days for each case.

In 53 cases, or more than one-third of all, the time of confinement was successfully though not exactly predicted, the birth occurring not earlier or later than 4 days from the predicted day.

The average error was about 7½ days,—a circumstance which indicates that the prediction should not state the week of confinement but the fortnight of confinement, there being generally an error of a little above 7 days on the one side or the other of the ascertained average day.

But the most interesting result of these figures is the answer to the question, Can the calculation be improved? and the answer is, that it is for practical purposes, perfect, or as nearly so as the present state of science permits. This near approach to perfection is shown, firstly, by the observation, that the errors on either side of the predicted day are nearly equal. If the errors on either side were exactly equal, then the calculation would be perfect; for it would thus be shown that, for the mass of cases, the exactly most probable day of confinement had been hit upon. In my 153 cases the excess of error is on the side of anticipation. This excess is 55 days. Now, 55 days for 80 cases is less than a day of average error; and as our prediction does not pretend to even the accuracy of a day, the error may be truly regarded as trivial.—*Edinburgh Medical Journal, March* 1871, *p.* 788.

81.—A CASE OF INDUCTION OF PREMATURE LABOUR BY MEANS OF THE UTERINE DOUCHE.

By W. Whalley, Esq., Bradford.

[The patient had had thirteen previous pregnancies. The labours had always been lingering and difficult. On the last three occasions craniotomy had been resorted to. There was a diminution of the cavity of the brim of the pelvis in the conjugate diameter.]

The patient consulted me again in August last, when about six months and a half advanced in pregnancy. With some difficulty I obtained her consent to allow premature labour to be induced at the seventh month. Accordingly, on September 7th, at 1 P. M., being exactly seven months since she last menstruated, I injected, by means of Barnes's syringe, a gentle stream of warm water against the os uteri for about five minutes. On September 8th, at 5.30 P.M., I introduced the tube of the syringe about an inch within the os uteri, external to the membranes, carefully detaching the latter, and then injected a stream of warm water for about six minutes. On the following morning, about 6.30, I was summoned to the patient, and found the os completely dilated, and the membranes protruding into the vagina. On rupturing them a foot and funis presented; the pains were strong and frequent, yet more than forty minutes elapsed before delivery could be effected. The fœtus was well formed, but exhibited no signs of life when born. The usual means of resuscitation were practised for a considerable time, but proved unavailing. The mother made an excellent recovery.

The above case affords additional evidence of the simple, easy, and efficient mode of inducing premature labour by the aid of the uterine douche. Had the presentation been natural, the child would undoubtedly have been born living. Notwithstanding this disappointment, it was gratifying to find that the patient, who had been three times subjected to all the suffering and danger attending the operation of craniotomy, fully appreciated the success of the operation.—*Lancet, Nov.* 26, 1870, p. 740.

82.—ON THE ADVANTAGES OF THE EARLY USE OF THE LONG FORCEPS.

By Dr. F. H. Daly, Dalston, London.

[The writer first states his belief that many lives are lost by procrastinating the use of long forceps in cases of contraction at the brim of the pelvis. In illustration he brings forward two cases, the second of which we give.]

The patient, a primipara, æt. 22, sent for her medical attendant on the morning of the 4th of June, 1868, at eight o'clock, A.M. She had been having slight pains all night; he found the pains becoming stronger, and the os about the size of a crown piece, the membranes not ruptured. The woman was ill shapen, and the pelvis peculiarly small, but having no appreciable deformity beyond the general smallness. Mr. Ryder visited the patient several times during the day; the os dilated somewhat, but got fixed between the brim of the pelvis and the child's head. He being satisfied that the head could not pass the brim, asked me to see the case with him. I found the pains very severe and long, and the woman getting very impatient; the os was, as stated above, fixed between the head and brim. So small was the pelvis, that we both feared the undiminished head could never pass; however, we determined to wait some time longer before interfering. At 12.30 A.M. we again met, the case had altered in no particular, except that the patient was getting more and more restless. We therefore determined to give chloroform, and try the long forceps without further delay; but the patient, although most anxious to be delivered with instruments, would not have chloroform. I therefore proceeded to apply the long forceps without the anæsthetic; but in consequence of the extraordinary smallness of the pelvis, and the high position of the head, it was only after several failures that I succeeded in getting on the second blade and locking the instrument; then having tied the handles together I commenced making traction. For more than half an hour Mr. Ryder and myself, relieving each other, used traction with quite as much force as was justifiable, without making any very perceptible result, and it was nearly an hour and a half from the time I got the forceps locked, until I delivered her of a male child about the average size, having its head considerably and curiously elongated from the pressure and traction.

Mr. Ryder informs me that, upon his calling on the third day afterwards, his patient was sitting up in bed having a chop, and the child's head was the natural shape. She was up by the end of the week, and never had a bad symptom.

Remarks.—My apology for bringing these two cases before this Society is the fact that general practitioners, as a rule, delay much too long before applying the forceps, and especially the long instrument, and my belief that an expression of opinion by some of the leading Fellows of the Obstetrical Society would naturally have much weight, and induce a more early use of the forceps, when the head is *above* the brim of the pelvis, than is generally recommended in the text books, and, as a result, the saving of many valuable lives. I know, as a practical fact, that a large section of medical men only resort to the long forceps when the patient is *in extremis*, and as a consequence, if the patient survives an operation undertaken when she is in a state of exhaustion, she runs the risks consequent upon allowing the uterus to wear out its contractile power, such as hemorrhage, or the absorption of purulent or other poisonous matters.—*Obstetrical Transactions*, 1871, *p.* 4.

83.—ON THE MECHANISM OF THE EXPULSION OF PLACENTA.

By Dr. J. Matthews Duncan, Edinburgh.

Every one knows that the membranes are expelled inverted or flapped over upon themselves; and the same view is held regarding the placenta.

It is to this last part's condition during expulsion that I am now directing attention.

The wall-plate of Schultze is an admirable representation of the expulsion of the placenta as it occurs in the first two modes described by Baudelocque; and I may add that this author's descriptions have been repeatedly copied. Baudelocque, drawing chiefly on his imagination for his supposed facts, says:—"Sometimes this separation begins at the centre of the placenta, and sometimes at some point of the circumference, which produces different phenomena. In the former case, the middle of the placenta being pushed forward, it forms a bag behind which fills with blood, and it presents that side to the touch which is covered with the membranes and vessels. The placenta forms nearly a similar bag, and presents in the same manner, when it begins to separate from the uterus at that part of its edge which is furthest from the orifice. But things go on very differently when the separation begins at its lower part, especially if it be in the neighbourhood of the orifice. In this latter case, the placenta rolls itself up in the form of a cylinder, and according to the length of the uterus, so as to present its anfractuous surface to the touch; and its exit is always preceded by a little fluid blood." Schultze goes a little farther than Baudelocque, and actually describes the accumulated hemorrhage from the uterine sinuses as co-operating to push down the already almost completely detached placenta and complete its separation,—a view so utterly unsupported by observation or argument, and so unlikely, that I shall not say anything more regarding it.

Now, the erroneous belief that the placenta generally descends, presenting its fœtal surface, seems to me to have arisen from observers not keeping in mind the very great frequency with which the natural mechanism of delivery of this cake is interfered with. I may say that it is unfortunately the rule to interfere with this part of the natural mechanism of delivery. Such interference, generally carried out as it is by pulling the cord, produces an unnatural mechanism—inversion of the placenta, as Ramsbotham calls it, and this unnatural mechanism, this inversion of the placenta, comes to be described as the natural conduct of the delivery. The placenta, says Rigby, "descends into the vagina inverted, *i.e.*, with its fœtal or amniotic surface turned outwards. Whether or not," he adds, "this is produced by pulling on the cord, is perhaps a question."

To find out the natural mechanism of the expulsion of this cake, it is only necessary to watch the process as nature conducts it; that is, in cases in which the practitioner does not try to modify it in any way. This any one can easily do, by wounding or otherwise marking the part presenting at the mouth of the womb, and then after its birth examining the placenta to find where the wound is; or the observer may pinch the part first presenting at the vaginal orifice, and retain hold of it till the whole is born, and then find what is the part so pinched.

In this way it is easily discovered that the part of the placenta presenting at the os uteri, and subsequently at the os vaginæ, is not the fœtal or amniotic surface, but the edge of the placenta, or a point very near the edge. When it is not exactly the edge, the placenta is not inverted or folded upon itself, there is only a little of the lower marginal part of the cake transversely folded up; it is still really the edge that presents, only thickened a little by being folded on itself; and I think this folding occurs chiefly in placentæ which are thin at the part folded. This folding is manifestly caused by the pulling up of the edge by the still adhering membranes; the resistance of the force required for their separation being greater than the rigidity of the marginal part of the placenta so folded.

My own numerous observations satisfy me that the inversion of the placenta, or its folding upon itself transversely to the passage, or the presentation of its fœtal surface, as authors describe, and as Schultze and others depict, is a very rare occurrence,—so rare as to debar describers from calling it *a* natural, and still more from calling it the natural mechanism. *The placenta is folded upon itself during the process; but the folds*

are according to the length of the passage, not transverse to it, as inversion or presentation of the fœtal surface imply.

These remarks are remarkably corroborated by the memoir of Dr. Lemser on the Physiological Separation of the Placenta. This gentleman's observations appear to me to be inconsistent with the views of Baudelocque and Schultze as to the separation of the placenta, and they are undoubtedly, the best observations on the point which we possess. But it is more interesting, with a view to the present discussion, to remark that Lemser always describes the border or edge of the placenta appearing in the os uteri as the ordinary result of separation and propulsion of the cake.

The advantages of the natural mechanism, as I have described it, are obvious. It is true, that after the passage of the bulky child, there is no such necessity for a mechanism of the delivery of the comparatively small placenta as there is for the passage of the child's head. There is ample room and verge enough for the placenta passing in any way. But the natural mechanism claims respect as the *natural* mechanism, and, moreover, it presents obvious advantages over any other mechanism. Just as the child's head passes through the pelvis so as to dilate the passage as little as may be, or in the manner demanding least expenditure of force, so also does the placenta. It comes edgeways. If it came inverted, or transversely doubled up, or folded into a cup shape, we should have a body passing that required at leasttwice as much space as is required if it passes edgeways, and only longitudinally folded. But this is not the only advantage of the natural mechanism.

If the placenta is expelled as Baudelocque describes, and as Schultze depicts, then a loss deserving the name of a hemorrhage is almost as necessary as it is certainly a generally described accompaniment of the process of the expulsion of the placenta. For the placenta has a certain amount of rigidity, and its folding on itself and the forcing of it into a cup-like shape cannot be effected without a hollow space being offered for the reception of blood, or indeed without a certain force being exerted to produce the folding and a vacuum, which force will also tend to draw blood into the said hollow from the open uterine sinuses which were in apposition to the part folded. Baudelocque's descriptions and Schultze's drawings, while they do not give what is natural, yet do indicate a mechanism of which they justly make considerable hemorrhage a necessary or nearly necessary part. It would be easy to show great if not insuperable, difficulties in the way of this mechanism. It is enough for me to assert that it does not exist as a fact, save as a rare exception to the ordinary process. I say no more, because I have no intention of entering here on the subject of hemorrhage during the detachment and expulsion of the placenta.

According to Baudelocque and Schultze, the folding is always on the uterine surface. But this is far from being the case. According to Lemser, it is more frequent than folding upon the fœtal surface. In my drawing I have represented the placenta, with a view to pictorial facilities, as folded upon its fœtal surface.

If the placenta comes edgeways, its uterine surface glides along the surface of the uterus; its foldings, parallel to the length of the maternal passages, are well squeezed together, and little space is offered for the reception of blood flowing from uterine sinuses. The uterine wall keeps close to the folded placenta. The uterus contracts, forces the placenta downwards, and as last its body is nearly globular and empty. There is no hemorrhage worthy of the name. Hemorrhage when it does occur,is not demonstrated to take place according to the description of Baudelocque or the plate of Schultze; and I believe these gentlemen do not give the correct account of it. Authors too frequently. I may say almost invariably, describe too great an amount of hemorrhage as part of this natural process. I admit that the frequency of some hemorrhage is a strong argument in favour of this *proceeding.* But I believe that interference, which though common, is *frequently* injudicious, is occasionally the cause of this hemorrhage, which *is, therefore,* in such circumstances, unjustly laid to the account of the

natural mechanism. It is far from uncommon to observe labours in which there is no hemorrhage, in which not an ounce of blood is lost during delivery, there being only enough to smear the uterine surface of the placenta with a very thin layer. This absence of hemorrhage I regard as the natural state, and in this I suppose all obstetricians will join me, at least if I introduce the element of desirableness as an indication of naturalness. Such absence of hemorrhage depends on the adoption of what I describe as the natural mechanism. The presence of hemorrhage is a part of the erroneously described natural mechanism, and to me this presence is one proof of the erroneousness of the description.

But although the mechanism of Baudelocque and the picture of Schultze do not give the natural process, they indicate a state of matters which is frequently observed after the separation of the placenta. Schultze's second drawing is an admirable representation of what takes place frequently, perhaps generally, when any considerable force is used to deliver the placenta by traction of the cord. Then indeed, truly, the placenta is inverted, and its edge puckered up purse-like. The insertion of the cord comes first, and is so frequently represented in woodcuts. The placenta is transversely bent on itself, and puckered up; hemorrhage flows to fill up the partial vacuum which is thus produced. The inverted mass forms a firm plug, closely filling the vagina. Traction on this plug is exactly like traction on the piston of a pump. If hemorrhage does not naturally take place to fill up the void which tends to be formed beyond the placenta, then it is powerfully attracted and induced by the piston-like action of the placenta pulled by the cord. The interior of the uterus, already scarified by the separation of the placenta, requires but this pulling at the cord to be effectively cupped.

From all this there follows the very valuable corollary, that in practice the third stage of labour should be left to nature, and that, when interference is required, the natural mechanism of the birth of the placenta should be as closely imitated as circumstances admit.

I shall conclude with a quotation from Cazeaux, which shows that this practical view has not been altogether neglected:—"'When the placenta is partially engaged in the orifice (of the womb) by a portion of its periphery, this plan,' says M. Guillemot, 'ought to be somewhat modified; for in this presentation, the root of the umbilical cord, instead of corresponding to the cervix, is higher up in the uterine cavity; and hence, if the operator resorts to traction, the centre of the placenta will have a tendency to enter the orifice, and thus add its bulk to the disk already engaged there. Such a disposition sometimes constitutes an obstacle to the further delivery of this mass; but it is surmounted by making some moderate tractions, not on the cord itself, but rather on the part previously engaged, by applying two fingers on its surfaces.' We have," adds Cazeaux, "had numerous opportunities of testing the practical utility of M. Guillemot's advice."—*Edin. Med. Jour., April* 1871, *p.* 899.

84.—CASES OF PUERPERAL CONVULSIONS TREATED WITHOUT BLEEDING.

By Dr. J. J. Phillips, Assistant Obstetric Physician to Guy's Hospital.

[The plan of treatment pursued by Dr. Phillips has been in all cases the use of chloroform, without venesection. Whilst Chailly-Honoré (1859) relates that he saved eighteen out of the nineteen cases which he treated with chloroform, and Professor Braun, of Vienna, did not meet with a single death in sixteen cases treated by the same means; older records show a mortality of half, or at best, one out of three. It is undoubted that, at the present time, venesection is more frequently employed than any other remedy, in the treatment of the disease. Notwithstanding that, Brown-Sequard and others *state it as a fact*, that at the outset of an epileptic attack the *great nervous centres of* an animal subjected to experiment become pale, *instead of presenting signs of* congestion.]

It will only be necessary to refer to the teaching of Dr. Radcliffe, Dr. Hughlings Jackson and others, that the mass of evidence goes to show that spasm is a sign of enfeeblement of nervous matter. In the words of Jackson, "All clinical evidence points to this one general conclusion that nerve tissue is enfeebled in convulsions. Whether it be itself primarily in fault, or whether it suffers from want of blood, is poisoned by bad blood, or torn by cerebral hemorrhage, there can, I think, be little doubt that it is enfeebled." And again, "I have no faith whatever that convulsions depend on any increase of nutritive changes that we can arrest by taking blood out of the system."

The most plausible argument which has been adduced in favour of bleeding in puerperal convulsions appears to be that it acts beneficially by relieving the circulation, lessening secondary congestion, and thus preventing injury, especially to the brain and spinal cord. In severe and frequently repeated convulsions death may of course threaten at any time by asphyxia, and the pulmonary congestion may be beneficially lessened by a judicious bleeding. There appears to be, however, in the minds of many, a belief that venesection is in some way specially suitable for the convulsions of puerperal women; whereas the puerperal state itself furnishes a strong argument in favour either of its omission or of the use of the lancet with a sparing hand.

Moreover it appears to me that the necessity of the employment of bleeding for the object just mentioned will diminish greatly in proportion to the frequency of the administration of chloroform at an early period of the attack. We have in chloroform an agent capable at least of materially controlling the severity of the paroxysms. The experience of several British and continental physicians is strongly in its favour, and the following cases, so far as they go, tend to prove its efficacy.

It is to be remembered that long before the discovery of the intimate connection of puerperal eclampsia with albuminuria, the frequency of serous inflammation, especially of the peritoneum, in such cases had been very generally observed; and at a time when venesection was considered necessary to control the progress of such inflammation, this formed an additional reason for its performance. But since the serous inflammation probably bears an intimate relation to the kidney affection, there does not seem to be here any argument in favour of blood-letting; while the great liability to puerperal troubles of a toxæmic character after severe hemorrhage during labour, indicates the danger of depletion, at least in many patients, at such a time.

While we cannot consider bleeding as a remedy for puerperal convulsions, neither can we claim for chloroform, in the majority of cases with which we meet, any direct curative power. The theory that its beneficial effects are due to the temporary diabetes which it produces, and to the influence of this state in rendering innocuous the retained urea, is at least very doubtful. Not only will the convulsions frequently recur at first if the chloroform be altogether discontinued, but a perusal of the following cases shows that sometimes a convulsion will occur while the patient is under the influence of the anæsthetic. Generally, however, whether the convulsions result from uterine or vaginal irritation, or from the poisoned state of the blood, they are controlled by chloroform.

In thus either preventing the recurrence or in checking the violence of the paroxysms, chloroform is of great value in preventing or diminishing the secondary congestions and the exhaustion, which are universally admitted as the dangers to be apprehended from convulsions. In many cases also chloroform renders unnecessary any interference with the course of labour. With such an agent at command it seems to me doubtful whether it be advisable in the first stage of labour to resort to any mechanical means for dilating the neck of the womb; but if it be determined to *accelerate* labour at this stage, then chloroform renders harmless a proceeding which, notwithstanding its perfection as at present accomplished, *could hardly* fail to be accompanied by a temporary aggravation of the convulsions.

Moreover it is of great service in convulsions occurring during the second stage, when it is often expedient to deliver cautiously by instrumental aid. Thus to both the medical and the obstetrical treatment of these convulsions chloroform is equally applicable.

When the patient has already suffered from frequent convulsions before being brought under the influence of the anæsthetic, and great pulmonary congestion has resulted, as indicated by the continued lividity of the face and the quick respiration (a condition, however, in which the pulse may be frequent and irregular), the withdrawal of a few ounces of blood may probably be beneficial before administering chloroform. This, however, was not done in any of the cases here recorded.

The recommendation of Professor Braun should also be remembered, that if chloroform be not given in time to cut short a certain paroxysm, as much atmospheric air as possible should be allowed to enter the lungs during the convulsive attack and the coma immediately succeeding.

I know of no other precautions specially applicable; and I may say that I have never witnessed any untoward symptoms from chloroform in these cases, though I have had it administered in some instances continuously for several hours, and sometimes when the patient was already in a deep comatose condition between the attacks.

Case 1.—A patient of the Guy's Charity, aged 24, who had had two miscarriages, but no labour at term. At five a.m. on November 23rd, 1868, during the first stage of labour, she first complained of headache, and in twenty minutes' time she had a severe convulsion, which was repeated in half an hour. She was seen by me between six and seven o'clock, when a third violent paroxysm occurred. Body much distorted, face very livid, with foam at the mouth, teeth clenched. She was partly conscious between the attacks. The pulse was full and beat 112 per minute. A fourth fit of a severe strangling character soon happened, and lasted longer than either of the previous ones. There was no œdema. The bowels, it was stated, had not been relieved for two days. A drop of croton oil was given, and the patient placed under the influence of chloroform, and kept so until ten minutes past ten. Once or twice, when allowed partially to come to, twitchings of the facial muscles gave warning of a fit, but none occurred. At eight o'clock the os uteri was the size of a five shilling piece. At ten a.m. the uterus was acting well, and the head, evidently of a dead fœtus, was occupying the pelvic cavity. Labour progressed favourably, and the child was expelled at mid-day. The patient's urine was albuminous, but neither casts of tubes nor any blood could be detected. After delivery she was rather restless and wild in manner, and the pulse was 100 per minute. On the second day after labour the urine was free from albumen, and subsequently the patient's convalescence was uninterrupted.

[Several other interesting cases are given, and the author sums up with the following conclusions :—]

These cases are, of course, far too few in number to warrant conclusions being drawn from them alone. Evidence is, however, accumulating in favour of chloroform ; and I venture to submit the following propositions, which are, I think, supported by theoretical considerations and practical experience.

That bleeding has no claim to be regarded as a remedy for puerperal convulsions; and that in the majority of cases at least, if seen at an early period of the attack, it is unnecessary.

That bleeding is often injurious, by predisposing to various puerperal ailments, by retarding convalescence, and sometimes by increasing the violence of the paroxysms. Also that the present diminished mortality is probably chiefly due to the less free depletion which is now practised.

That the chief reliance should be placed on chloroform, which prevents the recurrence, or diminishes the violence of the paroxysms.

That in mild cases it is sufficient to keep the patient very slightly under the influence of chloroform in the intervals, more being given when indications of a fit are *seen*; but that in severe cases the patient should be kept *for a time uninterruptedly* under its influence.

That if the convulsions have already produced much pulmonary congestion, it is beneficial to withdraw a few ounces of blood before administering chloroform; and that generally it is advisable to lessen the tendency to cerebral congestion by the application of cold to the head.

That it is rarely necessary to interfere with labour before the os uteri is dilated, or in those cases where the convulsions precede labour; but that it is usually expedient in the second stage to complete delivery, due regard being had to the condition of the uterus.—*Guy's Hospital Reports*, 1870–71, *p.* 343.

85.—TWO CASES OF UTERINE TUMOURS, GIVING RISE TO HEMORRHAGE—TREATMENT BY PERCHLORIDE OF IRON INJECTIONS INTO THE UTERUS.

Under the care of Dr. MATTHEWS DUNCAN, at the Royal Infirmary, Edinburgh.

M. S., aged 38, was admitted to Ward 16, Royal Infirmary, Nov. 26, 1870. She is married, and has had three children, the last nearly two years ago. Until six weeks ago, she was a strong, healthy woman. About that time after a hard day's work, she had a copious discharge of bloody fluid from the vagina, probably about three quarts in amount. This discharge continued in small quantities for a week, at the end of which time she had a second attack of bleeding from the vagina as violent as the first. Three days after this, a third time, bleeding from the genital passages set in, the blood lost being in greater quantity than on either of the former occasions. This last blood-loss left her in a state of extreme prostration. Since then, she has had a slight daily discharge of blood. When admitted into the Hospital, she appeared extremely pale and anæmic. On physical examination, the belly is found to be natural, soft, and resonant down to the pubis. *Per Vaginam.*—The finger introduced discovers nothing abnormal at first, but, on careful examination, the body of the uterus can be felt between the external and internal fingers, and feels enlarged, rounded and not tender, about the size of a small egg. This swelling feels as if it affected the left side of the fundus chiefly. A probe passes into the uterus the natural length, and finds it to be movable. Speculum discovers in the vagina, trickling from the cervix, a small quantity of blood.

Treatment.—℞. Ext. ergot. liquid, ʒ j., twice daily; et syrupi ferri phosph., thirty drops thrice daily.

December 22. To-day, for the first time since admission, patient complains of a great blood-loss. On examination, the tumour described in the original examination feels larger. Uterus measures three inches and a half. One drachm of the liq. ferri perchloridi was injected into the uterus. Patient felt nothing.

23rd. After the injection yesterday, the discharge almost ceased.

26th. Since the 23rd, there has been a slight flow daily. To-day it is almost absent.

January 3, 1871. No bleeding since last report.

J. C. was admitted to Dr. Matthews Duncan's Ward, Royal Infirmary, Edinburgh, on December 19, 1870. She is 41 years of age, unmarried, and has had no children. She complains of a swelling in the left groin, increased flow at the monthly period, and of great pain during the first twenty-four hours of the discharge. She has suffered from this pain for about a year; it has been increasing gradually in intensity, and for the last two months has been very severe. The tumour first attracted her attention in the beginning of last October, when, stooping to pick up something, she felt the pressure of it. It has not she thinks, increased in size since then. Up to the time that these symptoms set in, patient had enjoyed moderately good health, and had regularly followed her occupation as a domestic servant. She has had a copious menstrual discharge, however, for many years: for the last three years it has been very abundant.

Physical Examination.—In the hypogastric region is observed a prominent,

hard tumour, approaching in size a five months' pregnancy, reaching to within an inch of the umbilicus, and presenting a surface nearly uniform, but not quite so. The tumour is quite movable, but not to a great extent. The uterine souffle, or something closely resembling it, can be heard, but not very distinctly. *Per Vaginam.*—The cervix uteri lies near the middle of the pelvis, and all around it is felt a dense hardness, somewhat lobulated. The cervix moves with every movement of the tumour. A probe passed into the cervix advances first backwards and then upwards. It enters about three and a half inches; cervix is small, and not softened.

Treatment.—December 30. Hemorrhage began to-day.

January 1. The bleeding is now severe. A drachm of the liquor ferri perchloridi was injected into the uterus this morning. No bleeding during the day, but to night a little discharge has commenced to flow.

4th. Since last report there has been a little blood lost every day, but not approaching in quantity to what came away before the injection.

17th. Has had no bleeding since the 4th; lips do not appear so white; patient feels strong and well.

Remarks.—These two cases illustrate well that most dangerous symptom of fibrous tumour of the uterus—namely, hemorrhage. It might with propriety be called a bleeding disease, because, barring the obvious inconvenience of a tumour of large size, the subject of it generally suffers little from its presence when this is absent. In the instance of M. S., had not bleeding set in she would have been unaware that any unnatural condition whatever existed. Here so much blood had been lost that the woman was brought almost to death's-door, and another equally severe flooding would probably have killed her. This her Physician in the country attested. The treatment by means of which this condition can be most successfully combatted, is that which consists in the injection of perchloride of iron into the uterus when symptoms of the approach of a severe bloodflow set in—that is, when there exists profuse hemorrhage about the time the monthly period is expected.

Dr. Duncan's method of procedure is as follows:—After the length and direction of the uterus have been ascertained by means of the ordinary sound, a hollow one is passed into the organ. A syringe, composed of vulcanite, containing about a drachm of the liquor ferri perchloridi, is fitted closely into the orifice at the proximal end of the probe, and its contents are gently thrown into the womb. No pain is generally felt as a result of this injection, but a feeling of burning is sometimes complained of. Dr. Duncan is inclined to attribute this to the regurgitations of some of the iron into the vagina. Dr. Duncan has found this mode of treatment highly successful in many cases, and most so in those where the symptoms calling for it were most urgent.—*Med. Times and Gazette, Feb.* 11, 1871, *p.* 158.

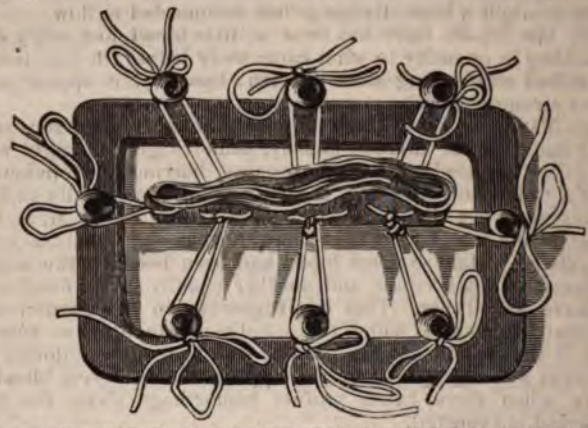
86.—A NEW INSTRUMENT FOR SECURING THE PEDICLE IN THE OPERATION OF OVARIOTOMY

By Dr. Graily Hewitt, Professor of Midwifery in University College, and Physician Accoucheur to the Hospital.

Surrounded as this operation of ovariotomy is with difficulties of various kinds, one of the greatest of these is unquestionably the treatment of the pedicle: not merely the securing of the vessels enclosed therein in such a way as to prevent hemorrhage, but the dealing with it in such a manner as shall best conduce to the prevention of the pyæmic complications attendant or liable to be attendant on the healing of the wound.

For the purposes of the present paper, I assume that the best method of securing these two results consists in bringing the pedicle to the external wound, and there fixing it; considering as I do that, on the whole, this method is attended with less risk of secondary hemorrhage; while it does not appear to be, *judging* from the results—the magnificent results, they

may be termed—of Mr. Spencer Wells's practice, more liable, at all events, than others to the pyæmic complications. Mr. Wells has largely employed, as is well known, the *clamp* in his operations. My experience, a far more limited one than Mr. Wells's, has made me acquainted with difficulties which seem inseparable from the present manner of clamping the pedicle, and which have given me no little trouble in some of the operations I have performed, and in which the clamp was used. The clamp, by its shape and form, hides from view the part of the wound immediately beneath it, and it is difficult to dress it and keep it clean and dry; while in cases of short pedicle it produces troublesome pressure on the edge of the wound, and leads occasionally to ulceration and sloughing from such undue pressure.



The accompanying wood-cut shews the instrument the actual size. A piece of leather is represented tied in the manner the pedicle is intended to be secured.

The newest form of clamp, though less liable to these objections, has another, which I have practically had experience of—viz., that it is liable to slip, and allow the pedicle to escape altogether.

The instrument and method I now suggest may be described as follows. A framework of steel, shaped something like a shoe-buckle, measuring two inches and a half by one inch and three-quarters; the piece of steel of which the framework is made being two-eighths of an inch wide and one-eighth of an inch thick, is provided with studs or buttons eight in number, three on two sides, and one on each of the other two sides. These buttons project three-eighths of an inch from the steel framework. It is to be used in the following manner. The pedicle, having been roughly trimmed, is perforated by a needle, armed with a double strong thread or whipcord ligature in two or three places, according to the width of the pedicle. It is then tied in segments; and the opposite ends are secured to the buttons of the framework above, one by one. The pedicle is now surrounded by the framework, while the edge of the pedicle is freely open to inspection and treatment in the centre; the tightness with which the ligatures are applied keeping the pedicle from slipping into the abdomen. In fact, the ligatures now act precisely as the tongue of a shoe-buckle.

The advantages of this method are, I think, sufficient to commend it. The wound can be more readily dressed; the pedicle is at all times accessible; the framework makes no pressure whatever on the edge of the wound at the point where the pedicle emerges; and the healing and covering in of the whole wound will be facilitated. There can be no question that dryness of the parts around the wound is most essential to the prevention of pyæmia; and it is exceedingly difficult to secure this with the ordinary clamp.

My first idea was to employ wire for the pedicle, but I find that strong *twine is* preferable, and infinitely more manageable. Messrs. Mayer and

Meltzer have constructed the instruments herewith exhibited.—*Brit. Med. Journal, Oct.* 29, 1870, *p.* 458.

87.—AN IMPROVED METHOD OF DIVIDING THE PEDICLE IN OVARIOTOMY.

By Dr. Geo. H. B. Macleod Regius Professor of Surgery in the University of Glasgow, and Surgeon to the Glasgow Royal Infirmary.

The only step in the operation of ovariotomy to which the writer wishes at present to refer is the mode of dividing the pedicle, certainly not the least important or the least anxious which the surgeon has to consider.

Whatever method the operator employs to separate the ovarian tumour from its connection with the uterus, he must desire—

1st. To arrest bleeding effectually and permanently.

2nd. To injure as little as can be the stump which remains.

3rd. To separate the growth and treat the remnant of the pedicle in such a way as to occasion least chance of peritonitis.

4th. To return no dead tissue, or structures likely to decompose (and be a source of septic poisoning), within the abdominal cavity.

5th. To displace the uterus and its appendages as little as need be from their normal position.

6th and lastly, To close the abdominal cavity as quickly and as completely as possible.

It will in no small measure depend on how these ends are fulfilled what risk is run of hemorrhage, peritonitis, and shock—the three great sources of mortality after ovariotomy.

The different plans in use for securing the pedicle may be thus summarised:—

1. Tying it in one, two, or more portions with whipcord or silk, catgut or wire,—the pedicle being divided a short distance on the distal side of the constriction. The stump is either fixed in the wound; or (when any of the agents mentioned are used except wire) the ligatures are cut short and returned with the stump into the abdomen; or, being uncut, are fixed in the lower part of the wound, while the stump is dropped as before.

2. The pedicle is strongly constricted by a clamp, the growth cut away, and the stump fixed in the wound.

3. The division of the pedicle and the closure of its vessels may be achieved by the actual cautery, the stump being afterwards returned, or retained in the wound.

4. The peritoneal covering of the pedicle being first incised, and then the pedicle, after which each separate vessel is taken up and tied, and the stump restored into the abdomen or fixed in the wound.

5. The écraseur has been employed to separate the ovarian tumour.

6. The pedicle having been transfixed by a strong ligature, and a long pin being passed through it and both lips of the wound, the ligature has been firmly twisted round the pin.

A consideration of the whole circumstances of the operation must impress the surgeon with the extreme desirableness of restoring the stump of the pedicle at once into the abdomen, if that can be accomplished without greater risk than attends its fixture in the wound. What has hitherto prevented this replacement being carried out was the peril of hemorrhage and the injurious effects of returning tissue tending to decompose—the direct result of the mode in which the pedicle had been severed.

When we ligature the pedicle (whatever agent we employ for the purpose) we necessarily kill a certain amount of tissue distal to the place of constriction, and to return this (and any portion, however limited of the ligature) into the peritoneal cavity must be attended with manifest danger, though, happily, such danger does not always eventuate in catastrophe. If, again, we leave the ligatures long and drop the stump, we add for a time (often *many days*) to the risk of having decomposing tissue in the abdomi-

nal cavity the additional hazard of keeping that cavity open, and traversed by materials which cannot fail to imbibe septic elements, and serve as conductors of secretions into the depths of the pelvis.

If, again, by the clamp or other means we fix the stump in the wound we cannot quickly or effectually close the abdominal cavity, or ensure it against the entrance of decomposing secretions by the side of the pedicle; and, what is much worse, and in fact is well known to augment greatly the peril of the operation, the uterus is violently dragged from its place and twisted on itself. That the clamp is no complete safeguard against bleeding is amply testified by the records of ovariotomy, and that its use necessarily retards recovery may be conceded.

That the écraseur has failed effectually to command hemorrhage, and that it causes so great a mangling of the stump as to occasion subsequent fatal inflammation, is only what those who have used it most would anticipate.

The cautery has frequently failed as a hæmostatic agent in ovariotomy (the bleeding being sometimes early and occasionally late of appearing) and its action is so violent that much tissue is killed; and so, if the stump is returned, the objection made to the ligature cut short holds; if it is not restored, then the same difficulty which attends the use of the clamp presents itself.

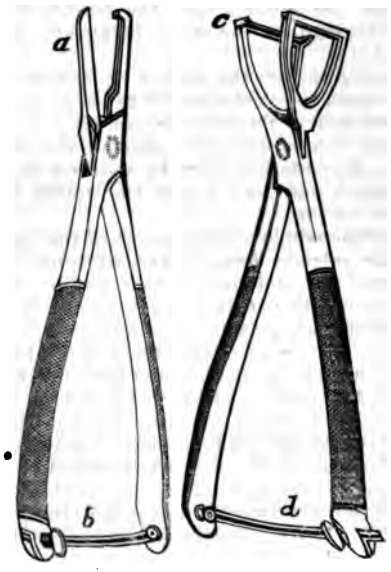
Of the results obtained from the division of the pedicle and the separate deligation of its vessels, the writer knows very little, but from its rare employment in this country he supposes they could not have been promising. There would be the hazard of foreign bodies placed within the cavity, the greater risk of vessels subsequently bleeding which were not at first observed, and the occurrence of oozing which no ligatures can effectually command

Regarding the pin and ligatures nothing need be said, as the same condemnation which applies to the ordinary modes of deligation applies to that method.

The plan which it is the object of this paper to submit to the profession seems to the author to obviate the chief objections before advanced against the methods at present in use, and though he has as yet only had one opportunity of submitting it to the test of practice, still it was so strikingly successful in that instance that he is somewhat sanguine of its adaptability *to the majority* of cases. Short, thick pedicles may possibly not be amenable to the following plan, but experience can alone fully determine this.

The instrument here delineated (Fig. 1) is employed to grasp the pedicle

FIG. 1. FIG. 2.



firmly near its uterine end. The blades (*a*) are narrow, and, being male and female, they take a very firm hold: their apposition being retained by fixing the quadrant (*b*) with the screw. The cyst is next cut away by dividing with a knife the extreme distal end of the pedicle, and the stump is caught, by means of the forceps here shown (Fig. 21, at a short distance from the part grasped by the instrument already spoken of. The form of the blades and the quadrant and screw enables this instrument also to take and keep a very firm hold. By slowly turning the forceps while the first instrument is kept at rest, the stump is twisted off close to the edge of the instrument by which it is held. Hardly any tissue remains external to the fixing blades, and the amount of injury done is most trivial. Possibly it would be better to incise the peritoneal covering of the pedicle before applying these instruments. The stump may now be returned with safety into the cavity of the abdomen, and the closure of the wound can be at once accomplished.

The case in which the writer employed this method was doubtless a very favourable one for such an experiment. Without entering into much detail, its leading features may be thus given:—

The patient was an unmarried healthy girl, nineteen years of age, who had suffered from an ovarian cyst of the right side for upwards of a year. The catamenia were scanty but regular before admission into hospital. She had been once tapped, about two months before ovariotomy was performed. At the time of the operation she measured thirty-nine inches in circumference at the level of the umbilicus. The uterus was central, movable, and of normal size. Fluctuation was marked and widespread. The abdominal parietes were unusually thick, and not apparently adherent to the cyst.

Ovariotomy was performed, in the presence of many medical men and students, on the 26th December. The chloroform was admirably managed by the house surgeon, Mr. Reid. No sickness followed. It is unnecessary to repeat the various steps of the operation. No blood vessel was tied or twisted. There were no adhesions. The parent cyst was large, and enclosed many secondary cysts having various contents more or less glue-like. The whole weighed 21½ lb., not calculating much fluid imbibed by clothes, &c. Not a drop escaped into the abdomen. The pedicle was of medium length, and was treated as before described. More time was taken up in the twisting than was probably necessary, from the desire not to rupture the pedicle prematurely; yet it is doubtless requisite for security that the torsion should be slowly performed. Not a drop of blood escaped, and the stump was replaced into the abdomen, and that cavity closed in the usual way, but not so thoroughly as in future cases would be accomplished, simply because of the fear that, after reaction was established, it might have to be reopened to command bleeding.

Not a bad symptom followed. The day after the operation a too tight strip of plaster caused the patient some pain, which was easily allayed by removing the cause, and she had also, as is usual, some annoyance from flatulence; but, beyond this, she so rapidly recovered that, if it had not been for the dread of running unnecessary risk, she might have been sitting up in a week. She was allowed, however, to sit up on the eleventh day; and was altogether beyond restriction as to food, &c., in a fortnight. The exceeding thickness of the abdominal parietes and the paucity of sutures employed caused the superficial portion of the wound to remain open longer than would otherwise occur. The exceedingly little general disturbance which followed, together with the perfect result, was not more gratifying than remarkable to all who watched the progress of the case. She was quite recovered about the time the clamp is found to separate in most cases.

The perfect arrest of all bleeding by the torsion was very striking, and, as it occurred in a strong healthy patient, it was a fair test of its power. Hardly a trace of injured tissue was left; immediate replacement was accomplished; the uterus and its appendages were restored to their normal position; and the abdominal cavity was effectually, quickly, and completely

closed. In short, every operative requirement as regards the pedicle was fulfilled.

It is a question for further observation how far the simple grasp of the first instrument, if continued for a short time, might suffice to close the vessels of the pedicle without the torsion. If that succeeded, it could be applied below the peritoneal covering of the stump, and all tissue beyond it cut cleanly away.

In conclusion, it may be stated that the idea carried out in the use of these instruments arose from seeing the apparatus employed by veterinary surgeons for castrating the horse lying in the shop of our most able hospital mechanist, Mr. Hilliard, and the strong conviction he expressed that some such applicance would be found an efficient hæmostatic agent in ovariotomy. The instruments before delineated were made by him for the author.—*Lancet, Jan.* 28, 1871, *p.* 108.

88.—CASE OF OVARIOTOMY; TUMOUR TORN AWAY FROM THE PEDICLE WITHOUT HEMORRHAGE; NEITHER CLAMP NOR LIGATURE REQUIRED.

By RICHARD H. MEADE, Esq., Consulting-Surgeon to the Bradford Infirmary.

[The patient whose case is related in the following paper was a married woman, 48 years of age, who had had several children. The enlargement of the body commenced on the right side two years before. Fluctuation was very distinct, owing to the thinness of the fluid. As a preliminary measure, tapping was first performed, and after the removal of the fluid a freely movable tumour, about as large as a child's head, could be distinctly made out, apparently springing from the right ovary. In five weeks the cyst had refilled, and it was determined to remove it.]

The patient being under the influence of chloroform, I made an incision about four inches long in the lower part of the linea alba; carefully opened the peritoneum; and evacuated nearly two gallons of ascitic fluid. On enlarging the opening in the peritoneum to the same extent as the external wound, the ovarian tumour at once came into view. I now directed an assistant to compress the abdominal walls with his hands, one placed on each side, so as to compress the edges of the wound backwards; while I endeavoured with my hands to draw the tumour partially through the opening. In doing this, the walls of several of the small cysts of which the tumour was principally composed (being very thin) were ruptured by the pressure of my fingers; and a considerable quantity of thick brown fluid, like dark-coloured linseed tea, escaped. The edges of the wound were so well compressed that none of this ovarian fluid was allowed to enter the peritoneal cavity. The tumour was now found to be firmly adherent to the free extremity of the great omentum; these adhesions were carefully and slowly torn through, and the whole mass was then easily drawn through the wound. It was now found to contain a good deal of heavy solid matter; and, on turning it over to examine its attachments the pedicle, which was small and thin, to my dismay and annoyance at the time, gave way, and the tumour tore itself loose from its connexions. Fearing hemorrhage, I kept hold of the remains of the pedicle, but very little bleeding followed; and I could find no vessel requiring ligature.

I kept a large piece of softened sponge applied to the torn pedicle, as well as to the adherent portion of the omentum (which was much thickened) for fully a quarter of an hour, the abdominal walls being well covered up with hot flannels; I also had the actual cautery in readiness; but all oozing soon ceased; so I left the pedicle without any fastening, and proceeded to close the wound. I inserted a number of thick silk sutures greased with carbolic ointment (made by melting one part of carbolic acid with seven of lard) *deeply* through the sides of the wound; but *not* through the peritoneum. The line of incision was then covered with a piece of lint, thickly spread

with the carbolic ointment; and over this a sheet of cotton-wool and a flannel bandage were applied.

The patient took chloroform very well, but retched slightly before the incision was closed. After she was placed in bed, and before the effects of the chloroform had quite gone off, I injected a sixth of a grain of hydrochlorate of morphia under the skin of the arm. The pulse was now rather feeble, but not quick, and she looked pallid and felt cold; but upon my seeing her again in an hour and a-half, I found her with a moderately full pulse of only 80 in the minute, and comfortably warm. There had been no more retching nor sickness, but she complained of abdominal pain: so I injected another sixth of a grain of morphia. On leaving, I directed that she should swallow nothing but a little iced water, with a few drops of brandy in it, if she were faint.

On the following morning (fifteen hours after the operation) the pulse remained at 80; there was a plentiful secretion of urine, and she was very comfortable.

This patient recovered almost without a bad symptom; I let the sutures remain until the sixth day, when, on their removal, the wound was found to have united by the first intention. No suppuration occurred, except at one or two of the suture-holes, where a little ulceration had been caused by the pressure of the silk. On July 21st, less than a month after the performance of the operation, she was downstairs, and had been out of the house, able to walk without pain or inconvenience. She then looked rather pale and anæmic, but the wound was firmly healed; there was little or no abdominal tenderness, and no return of ascites; but a little deep-seated hardness remained on the right side. I heard through one of this patient's sisters that she continued well at the beginning of September.

Upon examination of the tumour after its removal, it was found that, in addition to the cysts filled with dark-coloured fluid, there also entered into its composition considerable masses of gelatinous colloid-looking matter, with others of a firmer consistence and brain-like appearance, containing clots of blood: showing, I fear, that the disease was of a malignant character.

It is difficult to account for the large quantity of ascitic fluid which was met with, unless there were some secondary deposits of cancerous matter on the peritoneum; but the history of the case would hardly lead to that supposition. The presence of a considerable amount of serous effusion in the peritoneal cavity has, however, one advantage in cases of ovariotomy; it seems to render the membrane less liable to take on acute inflammation, its delicate secreting surface having undergone some change; and after the removal of the ovarian disease it does not seem to be resecreted.

In some of the medical journals a case of ovariotomy has been reported (extracted from an American periodical), in which Dr. Julius F. Milner removed a very large ovarian tumour by enucleation, without using either clamp, ligature, or cautery, and without hemorrhage. When I commenced the above operation I had no idea of imitating his proceeding, but when the tumour (to my horror at the time) enucleated itself, and there appeared to be no bleeding from the pedicle, I determined to follow his example, and leave the torn surface unsecured; thinking that the risk from hemorrhage was less than that from inflammation from the presence of a foreign body in the peritoneal cavity. My case turned out successfully, and I think I should venture to repeat the proceeding in some special cases; for instance, where the pedicle does not appear to be very vascular, when the attempt might be made to tear the tumour gently from its connexions (in the same way as adhesions are generally separated); but a firm hold should be kept of the pedicle, so that it might easily be secured in case of bleeding.—*British Medical Journal*, Nov. 26, 1870, *p.* 577.

89.—SOME CLINICAL OBSERVATIONS ON THE MALIGNANT DISEASES OF THE UTERUS.

By Dr. FORDYCE BARKER, Professor of Midwifery in the Bellevue Hospital Medical College, and Obstetric Physician to the Bellevue Hospital, New York.

The diagnostic characters of the malignant diseases of the neck of the uterus are now so clearly given by authors, and so readily made out, that I have nothing to add on this point. I heartily concur with my friend, Prof. Thomas, in his statement that "for the proper differentiation of true malignant disease from neoplasms and the results of inflammation we are indebted to no one so much as to Dr. Henry Bennet, of London."

But little, however, has been written on the diagnosis of uterine cancer where the cervix is not involved. In fact, until within a few years past, the cervix has been regarded as almost invariably the primary seat of the disease, and this belief has been sanctioned by the authority of Ramsbotham, Sir Charles Clarke, Walshe, and Rokitansky. But it is now known that it not unfrequently occurs primarily in the cavity or in the parenchyma of the body of the uterus.

The diagnosis of malignant disease, when its primary seat is in the mucous membrane of the body, can generally be made out from the following symptoms, as summed up by Sir James Simpson: (1.) "The presence of a constant, profuse, and offensive discharge; (2.) Frequent, profuse, and intractable menorrhagia; (3.) The presence of a hard, rough, and irregular tumour in the cavity of the uterus, detected by the uterine sound, and felt by the finger after the dilatation of the cervix; (4.) Recognition under the microscope of the morbid structures, as evidence of cancer; (5.) The periodic recurrence of pains slight and intermittent, perhaps, at first, but soon reaching a high pitch of intensity, and then gradually passing off." But where the malignant disease is primarily interstitial in its seat, the diagnosis becomes much more difficult. Dr. Grailly Hewitt mentions the following symptoms as the leading points of diagnosis: "The patient presents symptoms of uterine cancer—a vaginal examination fails to give evidence of it—a careful examination of the uterus above the pubes reveals the existence of an irregular, or possibly, of a regular tumour, which may be of considerable size. This tumour, which in its physical character may resemble a fibrous tumour of the uterus, is distinguished from the latter by the presence of a more or less constant, offensive, and bloody discharge, and some of the constitutional symptoms of cancer." In cases where vaginal examination fails to detect disease of the cervix, I regard hemorrhage, coming on spontaneously some years after the climacteric, as almost conclusive evidence of malignant disease, for I have never known polypi or fibrous tumours to bleed, for the first time, any considerable period after menstruation has ceased.

Treatment.—In the cancroid diseases, I think the fact has been established, beyond controversy, that the disease may be successfully treated by ablation, if the operation be performed sufficiently early to extirpate the entire diseased structure. In the London *Medical Times and Gazette*, October, 1860, nearly ten years since, Mr. Hutchinson published a tabular statement of fourteen cases of "epithelial cancer of the female genitals," in which eleven recovered after excision. In two the disease recurred and the patients died. In one the disease was too extensive for any operation. Since that publication, scattered through the medical periodicals, many other successful cases have been reported. Since 1856 I have ablated the cervix in eleven cases for this cause, nine of which have recovered and remain well. In one, death followed two days after the operation, from peritonitis, induced evidently by the imprudence of the patient. In the other, a patient of Dr. John W. Warner, the disease recurred a few months after, and the patient subsequently died.

In view of all these facts, it must be conceded that science has made great progress in successfully treating a class of diseases which, until quite re-

cently, invariably resulted in a fatal termination. But the same success cannot as yet be claimed as to the other forms of malignant diseases of the uterus. And yet I cannot but feel that there is much to encourage us to hope that in the future we may yet attain a very much greater success in the treatment of this most terrible disease, than as yet has been dreamed of by the most sanguine of scientific men. In the first place, we are making rapid progress in our knowledge of the histology of the disease, and the laws of its development. In the next place, facts are accumulating which show that spontaneous recovery has occurred in some cases, and art may yet, in a certain percentage, secure the same result. Aran quotes one case from Estevenet, in which the cancerous uterus was separated entirely from its attachments, and expelled by the woman in the effort of defecation, so that for some time there were hopes of her cure. Prof. Habit reports one case of spontaneous recovery in which the cancer involved both the uterus and the vagina. Virchow, Kiwish, Rokitansky, and Scanzoni, each report one case of spontaneous recovery from cancer of the uterus. Two cases of recovery have occurred in my own experience, unless there was some mistake in the diagnosis. As both of these cases were of great interest to me, I shall detain the Academy by a somewhat detailed history of each. The first, a married woman, aged 38, mother of four children, the youngest eight years of age, came to my clinic in 1852. She had previously been seen by the late Dr. Mott and had also been at the clinic of Professor Bedford, both of whom, as the patient said, told her that she had cancer of the womb. Whether this be true or not, I regarded it as such. She came to my clinic for nearly two years, during which time I applied the actual cautery some fifteen or sixteen times. I think, also, my friend, Prof. Charles Budd, who was then assisting me in my clinics, applied the cautery a few times. We were both of us greatly surprised at the result, as the disease seemed manifestly to decrease after each application, but it was not entirely gone when she became pregnant. Dr. Budd attended her at the time of her confinement, when she gave birth to a living child. The first stage was completed before Dr. Budd saw her, and the second stage was less than an hour, a complete refutation of the *a priori* objection which has been urged against the actual cautery, viz., that it is liable to leave an indurated cicatrix, which would prevent dilatation of the cervix in the first stage of labour. Dr. Budd has informed me within a few months past that this patient is still alive and in good health. I know not whether, in the light of my accumulated experience since that time, I should regard that case as one of cancer or not, but I think there can be very little doubt as to the following—a case which, for a time, brought upon me some unmerited reproach, but which has subsequently given me a great deal of undeserved reputation. In 1856 the wife of a prominent lawyer and politician in Massachusetts came to this city for consultation. She had previously been under the care of the late Dr. Green, of Worcester, and been examined by one or two eminent physicians in Boston. Her husband informed me they had called her disease "cancer of the womb." She was cachectic and very feeble, and for more than a year she had been suffering from severe and frequently recurring pains, repeated and profuse hemorrhage, with a constant, sanious, and extremely offensive discharge. The cervix was much enlarged, with a jagged, irregular surface, and the uterus was fixed and immovable in the pelvic cavity. My opinion as to the nature of the case coincided with that which had been expressed by those who had seen her before, and, of course, my prognosis was most unfavourable. But with the hope of diminishing the profuse vaginal discharge and the extremely offensive odour, and that by accomplishing this I should make her journey home more comfortable, I decided to apply the acid nitrate of mercury freely to the ulcerated surface of the cervix.

Some two weeks afterwards, I received a letter of bitter reproach from her husband, in which he said that soon after her return, her mouth became very sore, and her physicians declared it to be the worst case of salivation that they had ever seen. Several of her teeth had come out, and the discharges from the vagina had increased enormously, with which she had

thrown off masses of putrid and horribly offensive substances, so that it was difficult to remain in the room with her. The letter closed by saying: "Before you receive this my dear wife will have left me, and I shall always bear in my heart the feeling that you, by your experiments, have greatly added to her suffering and shortened her days." A few months afterwards I received a letter from him of quite a different tenor. She had quite recovered her health, and the disease was apparently cured. I have twice, within a few years, had the opportunity of making a vaginal examination of this lady. At the upper portion of the vagina a puckered cicatricial indentation can be felt and seen by the speculum, but nothing like the cervix or body of the uterus can be felt through the vaginal walls. Through the rectum I am able to detect what I suppose to be the remains of the body of the uterus. She is now 59 years of age, fat and stout and in robust health. It is an old adage that converted enemies become the most zealous of friends.

[Since this paper was read before the Academy of Medicine, a case has been published by Dr. Mettauer, of Virginia, which, in all essential features, resembles in a most remarkable degree the one related above. As these cases are, I believe, unique in medical literature, no apology is necessary for giving an abstract of Dr. Mettauer's case. "The subject of this case was a negress, aged about 35, married, but had never conceived, and who had for years suffered from uterine irregularities. . . . When examined per vaginam, the os and cervix, as well as a large portion of the body of the uterus, had disappeared entirely, as they could not be discovered by the most careful examination by the *toucher*, and the chasm remaining would have readily received an egg of moderate size. The examination caused some hemorrhage as well as pain, and the woman represented that bleeding was of frequent occurrence. The health of the patient was greatly impaired, as emaciation and debility had nearly rendered her helpless. So appalling was the condition of this poor woman, that the writer, after a full examination, determined to discard the case, believing it utterly hopeless. The entreaties of the woman, however, induced him to alter his resolution, and, merely to quiet her distress, his consent to undertake to treat the case was yielded. After regulating the bowels, and the use for several days of soothing vaginal injections, it was determined to use the acid nitrate of mercury to the ulcerated uterus, which was applied by saturating cotton lint with it, and then conveying the tampon-like body thus medicated to the affected parts through the expanded three-bladed speculum. The lint was heavily charged with the nitrate, but not to supersaturation, and carefully pressed into the ulcer. Over this was laid a thick pledget of lint saturated with salt water, carefully packed round the first dossil. . . . . In three days violent salivation came on, which continued over a month, during which there was no examination of the vagina or the ulcer. The lint came away during this time, but it was not known when. . . . The condition of the uterus was examined into the fifth week after the acid nitrate was applied, and most unexpectedly was found to have healed entirely, but no os, cervix, or appreciable body could be discovered, and all discharge had ceased. From this time the general health rapidly improved, and in two months the woman was apparently restored to sound health, her recovery being greatly promoted by the daily use of iodide of iron and a generous diet. She lived four years after this severe trial, enjoying good health most of the time, but finally died of some acute disease, of the nature of which the writer has never been informed."—*Contributions to Uterine Surgery, by John P. Mattauer, M. D., LL.D., Virginia. From Boston Med. and Surg. Journal, March* 10, 1870.]

If a young physician called upon to take charge of a case of uterine cancer should take up the most recent systematic works on gynæcology, as Byford, Thomas, Simpson, Hewitt, Courty, or Scanzoni, to ascertain what he could do to arrest the progress of the disease, to palliate symptoms, and to relieve suffering, I think the result would be a despondent impression as to any positive service he could render to his patient. Yet, in few diseases

are the resources of art so manifest and so conclusive as in this, for we can most certainly improve nutrition, relieve pain, secure sleep, and arrest the sanious offensive discharges and hemorrhage, and thus notably prolong life and make it tolerable to the end. I have often thought that the feeling on the part of the physician that the case is hopeless, discourages the constant and assiduous care which may really be of great service to the patient.

It seems to me that, within a few years past, our therapeutic resources have greatly increased, and that we may confidently look in the future for additions of great value. I shall, therefore, presume to add a few words on the constitutional, the local, and the palliative treatment of this disease.

Constitutional Treatment.—The doctrine that cancer has a constitutional origin seems to have been accepted without question until quite recently; but it is now beginning to be doubted whether the disease has not a local origin which develops secondarily a blood contamination. This view has been put forth with great force by Mr. Moore, of Middlesex Hospital, London, and I think that those who have studied the subject are strongly inclined to accept his doctrine. If in the future it prove to be true, we may anticipate great results and new discoveries of therapeutic agents in the constitutional treatment of this disease. I shall only allude to such as I can speak of from personal experience in their use.

Arsenic has long been in use in the treatment of cancer, and a host of prominent names might be quoted who have expressed great confidence in its value in this class of cases. But with the great majority of even those who have devoted their attention especially to this class of diseases this remedy does not seem to hold an accepted position as one possessing any specific value; for many years, however, I have used it, and have regarded it as more useful than any other known remedy in this class of cases. My experience has convinced me that it possesses a decided power in improving the general condition of the patient as to flesh and strength, in diminishing the discharges, in mitigating pain, and in arresting the progress of the disease. Patients themselves become so convinced of its usefulness, that I have never known one willingly to give it up, after having commenced its use. I prescribe it in small doses, three drops of Fowler's solution, to be taken always after eating. I have not been in the habit, until recently, of suggesting its use in the very advanced and hopeless cases, because I have expected but slight, if any, benefit in such cases, and I did not wish to jeopardize the reputation of a remedy which I esteem so highly. But in the past two years, I have often suggested it in these cases, and I believe it has always proved serviceable.

The Missisquoi water of St. Albans, Vermont, has in some cases seemed to be of great benefit in arresting for a time the progress of the disease. In many, the use of these waters has seemed to produce no results. Many others, to whom I have suggested their use, have never reported to me, and it is therefore probable that the results in these cases were negative. But in a few instances, one of cancer of the breast, and four of uterine cancer, the apparent effect has been more striking than any results that I have ever seen from any other agent. None were cured, but the ulcerated surface was cleaned off, as though it had been excised with the knife; the fetor, the discharge, and the pain ceased for some time, and the general health of the patient was greatly improved. One, a poor woman, whom I first saw in May, 1867, with ulcerated carcinoma, involving both the neck and the body of the uterus, and exceedingly feeble, emaciated, and broken down by the profuse and horrible offensive discharges and repeated hemorrhages, rapidly improved both in her local and general condition under the use of these waters. She is still alive, although the uterus is nearly destroyed, but her general condition is much better than when I first saw her. I will allude to another case, a patient of Dr. Sims. I first saw this lady with him in December, 1868. Dr. Sims informed me that, when he examined her in Paris, in August, the whole surface of the enlarged cervix was one mass of rough, ragged ulceration. When I examined her, the diseased surface was as smooth as *if it had been* excised with a knife, and there was no discharge

and no odour, although she suffered from horrible pains. She died a few months subsequently, but Dr. Sims expresses the strong conviction (and I concur with him) that her life was prolonged by the use of the Missisquoi waters. Although the general sentiment of the profession does not coincide with mine on this point, I cannot but avow the belief that the therapeutic effects of these waters are eminently worthy of careful investigation.

Dr. F. A. Burrell has published a very interesting case of apparent cure of ulcerated scirrhous cancer of the breast. It was for months treated with an external application of a watery solution of carbolic acid and glycerine, without arresting its progress; but it began to diminish in size and soon cicatrized after the internal use of carbolic acid and sulphate of quinine was added to the treatment. A table-spoonful of the solution of sulphate of quinine (four grains to the ounce of water), with three drops of the solution of carbolic acid (two drops being equivalent to one grain of the crystals), was taken three times a day. It seems to me that such cases as these are of some weight in sustaining the theory of Mr. Moore.

Local Treatment.—In all cases where the cancroid disease is confined to the cervix and can be wholly removed, I think the question is now settled that amputation of the cervix should be performed. Most operators use the écraseur for this purpose, but I have always used the knife, because I think it leaves the excised surface in a much better condition for healthy cicatrization, and I have never had any trouble from hemorrhage after the operation. I have several times seen the écraseur used for this purpose, and I cannot resist the feeling that the tissues must be more injured by this crushing process, and that they are left more liable to morbid development subsequently, than if the wound had been made by the clean cut of a knife. I am quite certain that the process of cicatrization is more rapid. It is hardly necessary for me to add that the operation should not be thought of if the disease exist above the vaginal attachment of the cervix, or involve the mucous membrane of the vagina, or where there is any evidence of its existence in any other part of the body.

Cauterizations.—There is a great difference of opinion among writers on this subject, as to the utility of cauterizations of the ulcerated surface of the epithelioma. By some they are regarded as useless, if not positively injurious; as useless, because they do not reach and therefore cannot destroy the whole extent of the morbid tissue; and injurious, because they may influence deleteriously the adjacent structure and excite inflammation, thus favouring extension of the cancerous deposit, and hastening the progress of the disease. I have carefully studied the objections which have been urged, and I admit their full force, if cauterizations be indiscriminately and carelessly made. But under certain circumstances I have the strong conviction that they are often very useful in arresting the ulcerative process in diminishing the profuse discharges, and thus saving the strength of the patient; in correcting the fetor, and thus lessening the chances of septic absorption. Where cases are seen at an early stage, and the ulcerated surface is small in extent, and the subjacent induration not profound, the progress of the disease has seemed to be manifestly retarded by their use. The principal agents which I have used for this purpose in the malignant diseases of the uterus are the actual cautery, the acid nitrate of mercury, and the chromic acid. In those cases where the malignant deposit has not extended to the adjacent organs, and particularly to the mucous membrane of the vagina, I use the actual cautery far more frequently than any other agent. My reasons for this preference are the following: It is a much more managable agent than any other, as it only acts upon the part with which it immediately comes in contact; the depth of cauterization can be perfectly regulated; no pain is produced by its use, either at the time or subsequently; and when the slough is thrown off no hemorrhage follows, as I have often seen occur when other agents are used.

I have chiefly used the acid nitrate of mercury in those cases where *granulations* sprout from the anterior of the cervix, which have a great *tendency to bleed.* But for some years past I have become very cautious

in its use, as in three instances I have caused profuse salivation by one application of this agent, and I have heard from medical friends of several other cases of like result. The susceptibility to this effect seems to be manifestly increased in a broken-down, cachectic system, and in such it is a consequence greatly to be deplored.

In cauliflower excrescence, where the disease has extended beyond the reach of the knife, I generally make use of the chromic acid (100 grains to the ounce of water), applying it very carefully with a pencil brush to the surface. Ordinarily its action is not followed by pain, but I should mention that in one case, six hours after the application of the chromic acid, severe pain came on, so that I was sent for in the night, and after using three hypodermic injections of morphia without relief, I was obliged to keep my patient under the full anæsthetic influence of chloroform for nearly four hours. A pretty severe attack of peritonitis followed, from which she entirely recovered in a few days. There was a complete and apparently healthy cicatrization of the diseased surface, and for more than a year I deluded myself with the hope that the disease was cured. But when it again appeared its progress was very rapid, and she died in eight weeks after the first symptom of its recurrence. I have repeatedly made trial of various other caustics, such as the arsenical paste, chloride of zinc, &c., but without such results as lead me to substitute either of them for those above mentioned.

Dr. Routh, of London, has published two very interesting cases of apparent cure of epithelial cancer of the cervix uteri by the use of a strong spirituous solution of bromine (bromine, gr. v.—x. to fifty minims of spirits of wine). Since the publication of the paper by Dr. Routh, I have seen no case where the use of this agent would be admissible, but I am determined to try it when a proper case shall offer. It should be mentioned that Dr. Routh regards it as a powerful caustic, which is not unattended with danger to the patient if not carefully applied, and to the operator in its preparation. I have made great use of bromine in the treatment of the malignant diseases of the uterus, but in a different way and for a different purpose, which I shall allude to presently.

Palliative Treatment.—On this point I shall add but a few words. I have long been impressed with the belief that many practitioners err, in allowing the victims of this disease to suffer, by trusting to feeble and inefficient agents, such as hyoscyamus, belladonna, cannabis indica, &c., for the relief of pain, from the fear that the patient might become habituated to the use of opium, in short, an opium-eater. Now, I hold that in such a disease as this we are bound to give our patients relief from pain if we can, no matter what the agent is, or how large the quantity or how long it may be continued. It has been said that a too early use of opium may lead to a habit which will injure the general health; but protracted pain, I believe, will injure the general health much more than any agent which may be necessary for its relief. If the milder agents will suffice for this, it is well; but there should be no hesitation, if they prove ineffectual, in at once resorting to the use of opium or any of its preparations which will best accomplish this. The special form of the agent which gives the most perfect immunity from pain, with the least reactionary evil, should be carefully ascertained by trial. In some, neither opium nor any of its preparations can be tolerated, and in these the chloral has proved an inestimable blessing. A patient that I now have, preferred to pass sleepless nights, tortured with pain, rather than endure the distressing nausea which followed a sufficient dose of any form of opium; and now she passes a blissful night of sleep by taking, on alternate nights, thirty grains of chloral. The effect is continued in a less degree the second night, but, if she takes it in any dose the second night, she suffers from both nausea and headache.

In some cases, there is great suffering from the extreme sensitiveness of the ulcerated surface, and this I have found best relieved by pessaries of iodoform, introduced at night into the vagina.

℞. *Iodoform, gr. x.*; butyri cacao, ʒ j.; glycerine, gtts. 5; M. One *pessary.*

These pessaries seem also to correct almost entirely the offensive odour of the discharges.

As lotions for arresting the discharges and removing the fetid odor, I have found the most useful to be a solution of bromine, or of permanganate of potash, or of carbolic acid. Where the cervix or any portion of the vagina is ulcerated, I am careful to direct that these lotions should not be forcibly projected against the diseased surface by any form of syringe, but that the vagina be filled by a syphon-tube from a vessel placed considerably above the patient. The "fountain syringe" accomplishes this result in a very convenient manner.—*American Journal of Obstetrics, Nov.* 1870, *p.* 519.

90.—ON THE FUNCTION OF THE PERINEUM IN PROCIDENTIA UTERI.

By Dr. J. Matthews Duncan, Edinburgh.

[The following paper was read by Dr. Duncan before the Obstetrical Society of Edinburgh.]

The causes of prolapsus of the uterus are very imperfectly known. Various circumstances which predispose to it, or more directly produce it, are generally described. Among these are childbirth, diminution of the retentive power of the abdomen, hard work or violent exertion, or any other cause of ordinary hernia.

But of late years, especially since the extensive recommendation of operations upon the perineum as a means of cure of the morbid condition, procidentia has been ascribed to laceration of the perineum. Most modern authors on the diseases of women do more or less prominently adduce this laceration as an important cause.

My object in the present paper is, *first*, to show that laceration of the perineum is not, in any strict sense, a cause of prolapsus or procidentia; *second*, to point out what influence laceration of the perineum exerts in this disease; *third*, to show what is the value of restoration of the perineum.

1. *Laceration of the Perineum is not a cause of Prolapsus or Procidentia Uteri.*—No one, so far as I know, has explicitly ascribed to the perineum any part in the maintenance of the uterus in its natural position. This is very remarkable, considering the great combination of authorities that can be adduced, who, by ascribing procidentia to laceration of the perineum, thus evidently imply that it has some power to maintain the uterus in its natural site. To prove that it has no such power, I rely upon the following arguments:—

In several cases of complete destruction of the perineum, the laceration extending backwards through the whole of the sphincter ani, which have come under my notice, and on which I have operated, there has been no example of prolapsus of the uterus complicating the laceration; and the great majority of them has been observed in poor, hard-working women. The perfection of laceration has been present, and its influence has been supplemented by those of childbirth and hard work, and, notwithstanding, prolapsus has in these cases not taken place.

I have seen a large procidentia in a young girl, who had never menstruated, whose perineum was entire, and whose hymen was not ruptured at its posterior part. Cases of this kind are not extremely rare. The perineum is perfect, and yet the accident occurs.

Numerous cases have come under my notice, in virgins and in sterile women, where the integrity of the perineum did not prevent procidentia.

In the majority of the numerous cases of procidentia which come under my notice, the perineum is either entire, or not more injured than it is in the great mass of women who have borne a child.

I have no doubt that if, by way of experiment, the perineum was cut in a healthy woman, no tendency to prolapsus would be thereby

In judging of the state of the perineum in cases of procidentia, it is necessary to guard against a great source of delusion. In all there is, at first sight, an appearance of destruction of the perineum. Its antero-posterior dimension is always greatly curtailed, and this even in cases where it is perfectly entire, and where the hymen can be seen to be only injured and changed, not divided. The large bulky procidentia passing on the anterior margin of the perineum distends it, softens it, and pushes it back towards the anus, destroying its antero-posterior dimension, much as the body of the child does after the birth of the shoulders.

2. *The Influence of Laceration of the Perineum in Procidentia Uteri.*—While I have already given good reasons for believing that the perineum has nothing to do with the maintenance of the uterus in its natural position, and that laceration of it has no causative influence in the production of procidentia, there can yet be no doubt that laceration of the perineum favours or accelerates the occurrence of the procidentia in cases where the causes of this accident are in operation. The study of this point brings out the function of the perineum in this disease.

The uterus, morbidly propelled through the pelvis by the causes of prolapsus, comes at length to press upon the perineum, slightly distends it, advances along it, reaches the orifice of the vagina, protrudes through it, and is at last procident. It is evident, at a glance, that if this long course through the pelvis and over the perineum to the vaginal orifice is in any way shortened in its latter part, the sooner will the procidentia occur. To arrive at this stage of procidentia, the uterus has to go through a shorter course, and is therefore earlier procident. Now, laceration of the perineum, abbreviates the latter part of the path of the uterus just described. It does not produce prolapsus—that is owing to quite other causes; but it abets such causes by removing difficulties which otherwise would have to be overcome. These difficulties lie not only in the length and resistance of the perineum, but also in the smallness and tightness of the vaginal orifice.

A comparison with some of the phenomena of natural labour appears to me to be both just and illustrative. Just as the perineum is not a source of any of the forces which concur to produce the birth of the child, so it is in procidentia of the uterus. But though this is the case, its laceration makes the birth of the child more rapid and more easy; it secures a shortening of its course and an easy exit through the enlarged vaginal orifice. Just as a woman with laceration of the perineum will have the progress of a prolapsus to complete procidentia accelerated and facilitated in its latter part, so a woman in labour, who has previously had an extensively lacerated perineum, is liable to a precipitate birth.

3. *The Use of Restoration of the Perineum.*—I do not purpose here to describe the operation of renewing the perineum. I shall merely say that it is an operation I have frequently performed with much advantage. My object is to give what I believe is the correct theoretical statement of its use and value. There are other surgical appliances, especially the padded T bandage and the vaginal pessary, which are also of great use and value in the treatment of cases of procidentia. To these I shall have to refer.

It is a great mistake to suppose that a perineum, however renewed, removes any cause of prolapsus or procidentia. The causes of that displacement are all still present. The perineum is restored in order to resist the progress of the descending uterus. It may or may not succeed in doing so. This will depend on the force with which the uterus is propelled, and the force which the renewed perineum is capable of offering in resistance to it. In many cases the resistance offered by the new perineum is insufficient; it yields, and the uterus becomes again procident. The birth of a child may relax the renewed perineum without lacerating it, and thus, destroying its resisting power, may lead to a return of the procidentia; or, repeated child-bearings may take place before the return of the procidentia.

Restoration of the perineum is not a cure of procidentia. It deserves in some sense this *name* only when its rigidity is such as to be sufficient

effectually to oppose the progress of the uterus trying to force its way over it. This opposing power may be increased by the pressure exerted on it by the pad of a T bandage; or even a pessary may be further called in to assist in keeping back the propelled uterus. If one resistance to the advance of the uterus is not sufficient, another may be tried, or a third, or their forces may be variously combined to produce the desired result.

Here, again, the analogy of childbirth is very exact and illustrative. The child, like the prolapsing uterus, is propelled against the perineum. If the perineum is rigid, or if the propelling force is not great, the progress of the child may be arrested by the strength of the perineum. But, just as in most cases of prolapsus, continued propelling impulses at last cause the child's head to distend the perineum, and burst through the vaginal orifice. On the other hand, the powerful palm of the accoucheur pressing on the perineum may be sufficient to arrest the progress of the child. In the same way, the pad of the T bandage supporting the restored yet too weak perineum in a case of prolapsus, may be a sufficient addition to the resisting power of the perineum, and co-operate in effectually arresting the descending progress of the uterus.

The T bandage may not be efficient without restoration of the perineum, because without this there may be no part appropriate to receive the pressure of the pad of the bandage. The pad may be inefficient when pressing against the vaginal orifice, from the want of the aid of the restored perineum, and from the inappropriateness or inefficiency of the pressure. The advantage of having a perineum to receive the pressure of the pad of the T bandage, I have illustrated repeatedly to my pupils by the following rude analogy, in which the door stands for the renewed perineum, the intruder for the uterus, and the pad of the bandage for the owner of the house. It will be easier for the owner to keep the intruder out of his house, if his efforts are merely required to keep a door shut, than if there were no door, but an open passage ; and this is true, even though no aid is got from the fastenings of the door, such as is got from the power of a renewed perineum.

Lastly, it is easy to understand that that method of restoring the perineum is to be preferred which ensures to it the greatest degree of strength or rigidity.—*Edinburgh Medical Journal, Feb.* 1871, *p.* 673.

91.—OPERATIONS FOR VAGINAL FISTULÆ.

By Lawson Tait, Esq , Birmingham.

There is certainly no advance in Surgery of which we may be more justly proud than that by which, of late years, we have been able to relieve the terrible suffering entailed by a vaginal fistula. The operative measures for the cure of this affection are not yet complete, and they are still somewhat open to the objection made to them in 1855 by a very distinguished Surgeon, who wrote that this condition "enables us to consign to the Surgical arsenal as curiosities a great variety of instruments, no longer of use, but which will remain as testimonials of the efforts of modern Surgery to cure or relieve a miserable state." Many of the instruments invented for the operation for vesico-vaginal fistulæ have been terribly ingenious, and correspondingly expensive ; but none of them that I have yet seen can accomplish any feat which simpler means cannot affect. No complicated wire twister can do what the fingers can ; and none is so safe because no apparatus can appreciate tension. Portes-aiguilles are cumbrous, and seldom effective, while they are always costly. None of the many complicated needles invented for this, and the kindred operations for cleft palate, *can*, as far as I have seen, do what the two simple needles figured below *can* ; and as I have always made it a rule in my own practice never to use *a special* apparatus to do what can be effected by one of more ordinary

purpose, I make no apology for pressing these on the attention of those who have to perform such operations. One is the ordinary tubular needle of Simpson, which, in making a stitch, I always introduce first by the left hand. I then make slight traction on the wire, so as to lift its loop up from the point of the needle, and, introducing the other needle through the other flap, opposite the first, the wire is easily caught in its notch, and the stitch completed. The mechanism of this second needle is, I fear, too simple to be a novelty in Surgery; but, as I have not yet seen a description of it, or of its application to the operation for fistula or cleft palate, whilst I can find an abundance of more complicated and less effectual instruments, I venture to claim it as an original suggestion. In my paper on the "Treatment of Cleft Palate" in the British and Foreign Medico-Chirurgical Review for August, 1870, I have figured it, of smaller size, amongst a set of instruments adapted for staphyloraphy, and in that operation I have found it of signal service. In the case of a very small fistula, or one high up in the vagina, these needles are of great service, for a little practice enables one to insert a stitch by their means without any of those preliminary threads or double loops which formerly added to the tediousness or irksomeness of the operation. The absolute certainty, too, which the two needles give of the points of insertion for each stitch being exactly opposite is a great recommendation for their use. My experience of them has been as yet limited to two cases, but in these they served me so well, and under somewhat trying circumstances, that I believe they will be found equal to any emergency.

Case 1.—B. C. was confined of her fifth child, in June, 1868, and was allowed, by an unqualified Practitioner, to remain thirty hours in acute labour. She was ultimately delivered by the long forceps by Mr. Secker, of Wakefield. I saw her with Mr. Secker, a few days afterwards, for an attack of metritis, and I gave it as my opinion that some sloughing would probably take place, and a fistula form, if she survived the process. Three weeks later I again saw her, and found that a large slough had separated from the lip of the uterus and anterior wall of the vagina, but the tissues were still in such a state that none but palliative measures could be employed. Six weeks later I again saw her, and found that, in spite of the use of the catheter, there remained two fistulæ—one, the larger of the two, being almost within the os uteri, and another, little more than a perforation, about three-quarters of an inch lower down, On September 24, I pared the edges of the lower opening, and inserted easily three stitches, close together, by means of the two needles. From the position and size of the fistula I could not, of course, see the points of the needles; but it will be easily understood that it is not necessary to see them. I removed the stitches on October 4, pared the edges of the other opening, and inserted five stitches. These were removed on the 14th, and a complete cure was effected. During these operations, I had the kind assistance of Messrs. Secker, Horsfall, and Whiteley.

Case 2.—M. S., aged 17, was confined of an illegitimate child in May, 1868, and is supposed to have been two or three days in labour. It is worthy of notice that many cases of fistula occur in unmarried women, and it is due no doubt to their attempts to conceal their condition. After her labour, M. S. passed through what she called a fever, and, when she got well, found that her water constantly drained from her. After many months of *suffering, she* was placed under my care by the author of it, and

found that she had a small fistula immediately below the anterior lip of the os uteri. It would not admit a sound, and its position was only ascertained after the injection of milk into the bladder. Owing to the fact that the poor girl would not allow any one to see her but myself, I had to operate on her without chloroform, and with the assistance of her mother alone, who held the duck-bill speculum for me. I pared the edges of the fistula, or rather cut it out in the midst of a piece of mucous membrane, and inserted two stitches. These were removed in fourteen days, and a perfect cure resulted.

It is very pleasant to record successes, but failures are much more instructive. I therefore narrate (3) the case of ———, a patient of the late Dr. Whitworth, of Heckmondwike, near Bradford. She, two, had "happened a misfortune," as they say in Yorkshire, and had been several days in labour. The resulting sloughing must have been terrible, for she never menstruated after confinement; and I never could determine the presence of a uterus by examination either by rectum or bladder. On passing the finger into what had been the vagina, and of which the opening seemed all that was left, the finger went at once into the remains of the bladder—a *cul-de-sac* about the size of a plover's egg, in which the papular orifices of the ureters could be felt. About three-quarters of an inch of the posterior wall and the whole of the urethra was left; nothing else but hard cicatricial tissue and an opening into the rectum three-quarters of an inch long could be determined. I must confess I was puzzled what to do; but on careful consideration, I determined to try to close the rectal fistula, and if I succeeded in this, I should then have closed the orifice of the vulva, and made the whole remnants into a bladder. It is more than possible she would not have submitted to this, for incredible almost as it may seem, I was given to understand that she still exercised some sort of sexual functions. What these were I am at a loss to understand. On December 8th, with the assistance of Dr. Sykes and Whitworth, I pared the edges of the rectal fistula and inserted four stitches. At my visit on the 15th, I found them all torn out, but from what cause I could not ascertain. I repeated the operation, however, and left strict injunctions that no solid food was to be given; half a grain of opium to be given every night, and the gut to be very gently washed out with warm water night and morning. On the 22nd I found that, while the opiate had been regularly administered, my other directions had not been attended to, and I was on that account not surprised to see masses of scybalæ forcing themselves through the much-enlarged fistula, and the whole thing a complete failure. Dr. Whitworth was very anxious that I should try to take a flap from "somewhere;" but even if I had tried Jobert's elytroplasty, I did not see where I was to attach the flap after having got it; nor had I any certainty that it would remain undisturbed. I therefore declined to interfere further in the case; and I had the satisfaction afterwards of learning that several others who tried their hands at the unthankful work were no more successful. *Medical Times and Gazette, March* 25, 1871, *p.* 332.

ON THE CURE OF THE CHRONIC PERFORATING ULCER OF THE BLADDER BY THE FORMATION OF AN ARTIFICIAL VESICO-VAGINAL FISTULA.

AS PRACTISED BY THE LATE SIR J. Y. SIMPSON.

By Lawson Tait, Esq., Birmingham.

[illegible] as Sir James Simpson did to advance the profession to which he [illegible] devoted, it is to be feared that there has died with him a great deal [illegible] would have been of infinite value to humanity had it been saved for [illegible] as he was in recording, and indefatigable in making research [illegible] of healing, those who knew him can easily understand that there [illegible] observations made and conclusions arrived at by him

which have been left unpublished. It is with the view of saving a little of these that I venture to refer to two cases in the treatment of which I was associated with him, and in which the successful operation employed was a device original with him, and, as far as I have yet been able to discover, quite new in the annals of surgery. Of these cases I have no accurate and detailed notes. I may therefore be pardoned if I only briefly, and, as far as details go, perhaps rather succinctly, narrate the cases.

The first was the case of a young unmarried woman who had been in robust health until her bladder symptoms commenced. These consisted principally of intense pain round the neck of the bladder, bad at all times, but especially so during the act of micturition. A few minutes of comparative ease was obtained after the bladder was emptied; but the pain steadily increased as the viscus became distended, and she had again to pass through the terrible ordeal of its evacuation. This state of matters went on for many months, and every kind of sedative treatment was adopted, all kinds of injections into the bladder tried, and the ingenuity of her many medical attendants taxed to the utmost, without avail. The urine was always alkaline, but only slightly so; and it contained but a very small quantity of pus, with a trace of albumen. She at last was placed under the care of Sir James Simpson; and, as we came one day together from her bedside, he reasoned to the effect that the indication in her case was to put the bladder in a state of complete physiological rest; and to secure this it would be necessary to establish an artificial fistula. He carried his idea into execution, and with the most brilliant result; for the pain was at once relieved, and in a few weeks the ulcer was healed, the fistula closed, and the woman returned to her country home perfectly recovered.

The second case was that of a sempstress who, if I remember rightly, was a long time under the care of my friend Dr. Warburton Begbie, and was transferred by him to Sir James's ward in the Edinburgh Royal Infirmary. All other treatment having failed, an artificial fistula was established, with a result equally satisfactory as that obtained in the other case.

The pathology of these cases is well illustrated in another which is now under my care, in the person of a lady who has come to me from a long distance to be the subject of this operation. She is a young married woman, and had been in perfect health until her marriage, five years ago. She has had no children, and has suffered for more than four years with symptoms perfectly similar to those described in the first case. The only relief she obtains is from the injection of a strong solution of nitrate of silver, and the administration of this is so painful that it has to be effected under chloroform. Under my direction a catheter has been introduced into the bladder in order to imitate the condition arrived at by the establishment of a fistula, but the instrument cannot be retained more than a few minutes; and I know of nothing short of the fistula which will cure her.

The performance of the operation is easy enough; it is effected by introducing a grooved staff along the urethra, and slitting-up the posterior fourth of the canal and about an inch of the posterior wall of the bladder. There is no difficulty in getting the fistula to close after the ulcer has healed; the difficulty is to get it to remain open long enough. The *rationale* of the operation is quite philosophical; but in principle it is unlike anything in surgery with which I am acquainted, except the establishment of an artificial fistula in the male perineum in order to promote the successful performance of an extensive urethro-plastic operation, which Sir Henry Thompson was kind enough to show me a few months ago.

The special form of ulceration by which these three women have been affected is referred to briefly by Rokitansky as a limited perforating ulcer; and, as I was once fortunate enough to be present at a post-mortem examination of a fourth case, in which the pain had caused death, I am in a position to verify that distinguished pathologist's views. In anatomical characters, as well as in semeiology, the ulcer closely resembles the perforating ulcer of the stomach; and Rokitansky tells us that in the bladder, as in the stomach, one of the means of the fatal issue is by complete perforation enl-

ing in peritonitis. It is somewhat curious that all of the four cases which have come under my own notice have been women, and comparatively young—circumstances which, together with others, remove it far from the ordinary catarrhal ulceration of the mucous membrane of the bladder. Of many post-mortem examinations of cases of the latter disease which I have made, I do not remember ever to have seen one in which the muscular coat was affected; the mucous coat seems to be invariably dissected cleanly off the subjacent tissue, and the ulceration is limited neither in extent nor locality. The perforating ulcer seems most frequently to exist at the neck of the bladder.

I have never met with or known of a case resembling these in a male patient. Were such a case to occur, should we be warranted in cutting him as if we wished to remove a stone from his bladder? I believe we should; for, if the disease is so terrible in a woman, what must it be in a man? and how much less likely the latter would be to derive benefit from any other form of treatment.

In surgical practice, as in almost everything else, it is extremely difficult to introduce anything really new, and it may prove that this treatment for the perforating ulcer of the bladder may not be so novel as I suppose it to be. It cannot, however, be very generally known; and if by making these two cases of Sir James's public I shall at any time be able to place in the hands of any of my brethren a successful means of treating a terrible disease, my object will be accomplished.—*Lancet, Nov.* 26, 1870. *p.* 738.

ADDENDA.

93.—DR. RICHARDSON ON CHLORAL HYDRATE.

Before commencing a lecture lately delivered on Experimental and Practical Medicine, Dr. Richardson offered some observations on the subject of Hydrate of Chloral, to which we would call the attention of our readers. He said:—

My lecture to-day is on Suspended Animation, but I will ask you to allow me first to offer a note or two on another subject, at this moment of urgent importance. I refer to the administration of the hydrate of chloral. There have recently been two assured deaths from the hydrate. In the course of the past ten days, I have myself been consulted not fewer than three times on what have been considered dangers attending the administration of the hydrate, and I know generally that doubt and uneasiness prevail in the profession respecting the abuse as opposed to the use of this agent. I think it right, therefore, as I had much to do in introducing hydrate of chloral into medical practice in England, to answer a few of the questions that are most pressing from this place, where so many demonstrations of the action of the hydrate have been carried out.

1. *Is the practice of resorting to the use of hydrate of chloral, as a narcotic, in the absence of medical advice and direction, becoming a common practice among the people?* The answer to this question is strictly affirmative. The novelty of its administration and of proving its effects at an end, the hydrate is not at the present time used so largely by the medical profession as it was a few months ago, when its true place in the Materia Medica was less clearly defined. The sale of the hydrate of chloral to medical men is consequently considered as declining, while the general sale is, perhaps, increasing. Corresponding with this state of things we, in the profession, are becoming conversant with cases of what may not improperly be called "chloral drinking," and in which serious and singular symptoms are presented. Three classes of people especially resort to hydrate of chloral—viz., alcoholic devotees, who take the substance to counteract excess of alcohol and to relieve alcoholic delirium; sufferers from neuralgia and other painful chronic diseases, who find in the substance temporary relief from pain; and persons having much mental worry, grief, or care, who, flying to it at first in order to obtain sleep, continue it until the occasional practice becomes a persistent habit. As an indication of the quantity of hydrate of chloral used in this country since its introduction here about a year and a half ago, I may state, incidentally, on what I have every reason to consider reliable authority, that one commercial house alone has supplied the English drug market with ten tons of the substance; three other houses have, it is supposed, supplied as much; so that fifty tons weight have been, on this calculation, sent out—an amount which, divided into grains, would yield over thirty-six millions of narcotic doses to England alone since August, 1869.

2. *What is a dangerous and what is a fatal single dose of hydrate of chloral?* The largest dose I have known to be taken is one hundred and twenty grains. This dose produced a prolonged and dangerous coma, but recovery ultimately followed. I think we may consider a hundred and twenty grains, as a maximum dose for an adult, dangerous, but not of necessity fatal. Beyond a hundred and twenty grains the danger increases, and a hundred and eighty grains may be considered a dose that would prove, in the majority of cases, *positively fatal.*

3. *What quantity of hydrate of chloral can be given with safety in divided doses during a stated period of time, say of twenty-four hours?* Judging from the physiological effects of hydrate of chloral in relation to dose, and to order of phenomena in relation to time, I should infer that the body cannot decompose and throw off the hydrate more rapidly than at the rate of from five to seven grains per hour. There will be difference according to age of persons, the temperature to which the body is exposed after the dose has been taken, and the largeness of the dose, a small dose being disposed of quicker in proportion than a large one. But the variation is not such as to alter materially the rate of action from the estimate given. I should consider, consequently, that a hundred and twenty grains, administered, even in divided doses, in twenty-four hours, would be the safe limit of administration. In the treatment of tetanus this proportion has been exceeded, but not, I think, to the safety of the patient; for the fact that the hydrate of chloral overcomes or reduces the spasm is no safeguard against its own poisonous effects. From what I know, I conclude that the hydrate of chloral can be given to the extent of overcoming the severest spasm; but if the dose be carried too far, with the determination of removing spasm at all risks, the success may easily be bought at the expense of a fatal narcotism from the remedy.

4. *Does the frequent administration of hydrate of chloral lessen or increase the danger of the administration?* On this question I am forced to state that the frequent administration of the hydrate of chloral, though it may suggest greater confidence in it on the part of those who take it, increases the danger from an excessive dose. Hydrate of chloral differs from opium in this respect. Opium produces chronic symptoms peculiar to itself, but the dose may be steadily increased without any immediate danger from the increase. Hydrate of chloral cannot be used in this accumulative way without danger. In a word, although a person may become habituated to hydrate of chloral, there is a limitation of the quantity to be taken safely, which limitation is not materially modified by persistence in the habit of taking it, but rather the reverse.

After discussing three other questions, relating to the symptoms and pathological changes incident to the habitual use of chloral hydrate, to the chemical tests for the hydrate in cases where it has caused death, and to the post-mortem distinctions in instances of chronic poisoning by the hydrate and by chloroform, Dr. Richardson, concluded by observing that, as the world was indebted to the profession of medicine for the benefits derivable from the hydrate of chloral, it behoved the members of the profession to use their influence in protecting the public from an agent which, under improper use, might be turned from its good purpose to positive evil.—*Lancet, Feb.* 11, 1871, *p.* 209.

94.—DANGEROUS AND FATAL RESULTS FROM THE USE OF HYDRATE OF CHLORAL.

By Dr. H. W. Fuller, Senior Physician to St. George's Hospital.

[In the following paper some cases are recorded in which moderate doses of chloral were productive of dangerous and even fatal results. They show that more caution should be taken in its administration than is usually done.]

On Feb. 9th, 1870, J. S. was admitted under my care into St. George's Hospital, suffering from slight anasarca and bronchitis connected with chronic Bright's disease. He was restless and nervous and unable to sleep, and therefore, after he had been some days in the hospital, and was exhausted for want of sleep, I ordered the chloral draught of the hospital (containing thirty grains of chloral) to be taken at bedtime. Soon after he *had taken it* he jumped up in bed, clutched at his heart, and complained *that the medicine* produced a sense of burning. In the course of a few

minutes he became violently delirious, and though after a time the delirium subsided, so much depression ensued that Dr. Jones, our resident officer, had great difficulty in sustaining his heart's action. Gradually, however, the heart recovered itself, the pulse returned at the wrist, and in a few hours he was out of danger.

Having just read M. Liebreich's assertion that hydrate of chloral, when in contact with an alkali, is transformed into chloroform and formic acid, it occurred to me that the extraordinary results witnessed in my patient's case might be attributable to an alkaline condition of the stomach, whereby the chloral was at once converted into chloroform, and thus induced the symptoms which were observed. I therefore determined to try it once again, taking care on this occasion to guard against such an occurrence by administering the chloral in combination with a full dose of acid. The result, however, was precisely the same as on the first occasion. Again there was the same sense of burning and oppression at the chest, followed first by violent excitement and delirium, and subsequently by collapse with failure of the heart's action; and on this occasion, as on the last, Dr. Jones was long doubtful whether the man would recover. I need not add that I did not make trial of a third dose, even experimentally.

From that time until the first day of the present year I did not meet with any case which led me to question the harmlessness of chloral. I had given it to hundreds of patients in doses varying from ten grains up to forty-five grains, and had been called in consultation to two patients, one of whom had harmlessly taken two drachms and a half, and the other three drachms, in the night prior to my visit. In some instances it failed as a hypnotic; in some it produced headache; and in others it gave rise to more or less excitement; but in none was it followed by any symptom calculated to cause alarm. On the 1st of last January, however, I was called in consultation to see a case in which thirty grains of the hydrate of chloral proved fatal. The patient, a young lady aged twenty, who was previously in fair health, complained on Dec. 29th of constipation and other symptoms of stomach derangement, for which her medical attendant administered a pill at night followed by an aperient draught in the morning. On the 30th the bowels acted, and she was relieved; but she passed a restless night, and on the 31st complained of uneasiness in the lower part of the abdomen, which was attributed to the approaching menstrual nisus. As she was very hysterical, a neighbouring practitioner was sent for early, and when he met the family medical attendant in the afternoon, they determined, as she was nervous and restless, and had obtained little or no sleep on the previous night, to give her thirty grains of chloral. She took the dose about 10 P. M. on the 31st, and almost immediately became much excited and complained of pain in the chest. In about an hour the excitement passed off, and she fell asleep and slept heavily all night. In the morning she was sleeping so heavily, and looked so pale, that the family became alarmed, and sent for the gentleman who had seen her the previous day. When he arrived she was very pale and breathing heavily—a sort of deep sighing respiration; there was no pulse at the wrist, and her extremities were rather cold. It was impossible to rouse her in the slightest degree. He gave her stimulants and applied warmth to the extremities, and gradually the pulse returned at the wrist, though at the best it was only just perceptible. The family medical attendant subsequently met him in consultation, and together they did all that appeared to be expedient; but as everything failed to rouse her, or in any way to alter her condition, they asked me to meet them in consultation at 2 P. M.

When I saw the patient she was lying on her back, with her eyes closed, and breathing heavily, the respiration having a distinctly sighing character. She was very pale, and somewhat cold; the skin was dry; the pupils were large and dilated, but acted sluggishly under the influence of a strong light; the pulse was scarcely perceptible, but the heart was beating regularly, about 120 in a minute, and though its action was very *feeble, its sounds* were clear and its rhythm was normal. There was no

distention of the abdomen—indeed, it was flat and soft; there was no contraction or rigidity or undue flaccidity of the limbs. It was impossible to rouse her in the slightest degree; but when fluid was put into her mouth she swallowed without much difficulty, so that she took a full-sized wineglassful of brandy-and-water in the course of ten minutes.

The indications for treatment being obviously to sustain the heart's action until the effect of the chloral had passed off, we determined to give her brandy and diffusible stimulants as far as possible by the mouth, and to supplement our efforts in that direction by repeated injections up the bowel of strong beef-tea and brandy. However, everything proved unavailing. She continued in much the same condition until about nine o'clock the following morning, when she sank, without having exhibited the slightest consciousness or moved a muscle from the time she fell asleep on the evening of Dec. 31st.

Judging from what I have learned from various members of our profession, I believe that although fatal consequences may rarely follow a dose of thirty grains of the chloral hydrate, yet that unpleasant, if not dangerous, symptoms are not unfrequently experienced. Dr. Tuke informs me that in a man whom he saw suffering from the effects of intemperance thirty grains very nearly proved fatal, the symptoms of depression and failure of the heart's action being most alarming; and Mr. Fred. Webb, of Maida-vale, has given me the particulars of another case in which an elderly man very nearly lost his life from the effects of thirty grains. The faintness, pallor, and depression of the heart's action were excessive, and for some time Mr. Webb was in doubt whether he would be able to sustain the pulsations of the heart until the effects of the chloral had passed.

Doubtless these cases are quite exceptional, and are met with only in about the same proportion as cases of death from the administration of chloroform. But the facts I have cited are sufficient to prove that such cases are more frequent than is commonly supposed. Further, they inculcate the necessity for caution in the administration of the drug; and they point to the conclusion that thirty grains form too large a dose for ordinary use, and especially for a patient in whom the effects of the chloral have not been previously tried. As a hypnotic in nervous restlessness, ten or fifteen grains ordinarily prove efficacious; and I have not seen or heard of any unpleasant symptoms following these doses. But the cases above recorded prove that larger doses, though usually harmless and often marvellously efficacious, are not unattended with risk; and now that the public are beginning to dose themselves with chloral, as they have done of late years with chlorodyne, this important fact cannot be too widely known.—*Lancet, March* 25, 1871, *p.* 403.

95.—EXPERIENCES WITH THE HYDRATE OF CHLORAL IN CANCER.

By Wesden Cooke, Esq., Surgeon to the London Cancer Hospital.

Long experience of the frequent failures of newly-projected remedies in cancer has made me slow to express publicly any opinion respecting the use of hydrate of chloral; but the results obtained in the cases in which I have employed it are so charming, so persistent, that, fortified by the published experience of others, I feel bound to add mine in confirmation of the excellent results obtained from the judicious use of this drug, and also a remark or two on the doses which will probably be found most efficient and innocuous. The cases I have to record are these: *Case* 1.—A poor fellow, aged about 50, has epithelioma running up the rectum and spreading itself externally about the anus. He has been in several hospitals. By the *employment of* opium and conium externally and internally the pain is *abated, but his* digestion, which is naturally good, is thereby much upset. *He was put upon* ten grains of hydrate of chloral three times a day; since

which he has been more free from pain, and the digestion is now not interfered with. *Case* 2.—In a case of advanced cancer of the uterus attended with much acute suffering, especially in the back, twenty grains of the hydrate of chloral always produce a comfortable night's rest and no morning sickness. *Case* 3.—A bad case of epithelioma of the ear extending to the scalp, attended with much pain, and the patient is subject to frequent attacks of gout. Ten grains of hydrate of chloral given three times a day. By this he is made perfectly comfortable; there is no sickness, he takes his food well, and the gout has subsided. *Case* 4.—A very bad case of epithelioma of cheek, with perforation, attended with much pain and difficulty in taking food. Sleeps well with twenty grains of chloral. No morning sickness; appetite good. *Case* 5.—I was recently called to see a very anæmic lady suffering from sloughing cancer of the right breast, attended with much sickness and severe pain—apparently dying. She has been restored to comfort and appetite by ten grains of chloral, with five minims of prussic acid, three times a day. *Case* 6.—A most painful case of psoriasis of the lips and fauces, the mucuous membrane being quite destroyed, leaving a raw surface, a long time under treatment by various Surgeons, relieved entirely from pain by ten grains of chloral three times a day, enabling the patient to take food comfortably, which had not been the case for a long time. *Case* 7.—A bad case of cancer of the tongue; great pain and inconvenience in taking food. Much relieved and the facility of taking food greatly increased by ten grains of chloral three times a day. Sleeps well since taking the chloral. *Case* 8.—Another case of uterine cancer with great pain in back is made comfortable by ten grains of chloral three times a day. Pain in back gone, takes food well, and sleeps well. In one case of uterine cancer the patient prefers the injection of opium into the rectum as being more efficient in the relief of pain, and in another case of cancer of the breast, attended with severe bronchitis, there was a complaint of headache and some delirium at night, but I am inclined to think that the dose had been too large in this case—viz., thirty grains. Thus far, as a night draught, I have found twenty grains quite sufficient. But when pain is persistent the ten-grain dose three times a day gives the greatest satisfaction. There is no headache, no sickness, no loss of appetite, nothing to hinder the patient taking exercise, and, so far as the disease will permit, pursuing his usual avocation. Although many Practitioners have advocated larger doses, I am still of opinion, fortified by the results of trials in many more cases than those above recorded, that no advantage is obtained by much exceeding these limits. Occasionally the combination of morphia has proved beneficial, but in matters of practical science, believing that unitarianism is the only safe method of inquiry, I would urge that in all cases requiring hypnotic or sedative remedies the hydrate of chloral should be used, unaided by any other similar drug, and, if it fails, to abandon it altogether. Tincture of orange-peel in water covers the rather nauseous taste very effectually.—*Med. Times and Gazette, Dec.* 31, 1870, *p.* 750.

96.—CHLORAL HYDRATE.

By H. Fly Smith, Esq, Chepstow Villas, London.

[The following case is worthy of notice, as it shows how greatly the effect of a drug may be modified by the vehicle in which it is administered.]

My patient, a lady, has been taking thirty grains of chloral hydrate in flavoured syrup as a night draught for the past three months, with the effect of lulling neuralgic pain, so as to allow of pretty continued sleep. The influence of the drug has usually commenced about two hours after administration, and continued during the night without marked symptoms. Two nights ago I changed the vehicle (a strong syrup containing ten grains of chloral hydrate to one fluid drachm) for camphor water in the same proportion. The customary dose was taken, three fluid drachms by measure,

in a wineglass of water. I happened to be in the room at the time, and was surprised by seeing the patient about fifteen minutes after taking the dose sink down on the floor (she was standing by the bedside at the time) in deep unconscious sleep, as though thoroughly under the influence of chloroform. I placed her on the bed. In about five minutes the respiration became a little troubled, and the teeth clenched, perhaps due to the smelling-salts and eau de cologne which I held to the nose. Gradually semi-consciousness returned, and after fifteen minutes the patient was sufficiently restored to sit up and to assist in finishing undressing herself for bed; but she was wholly unaware of what had occurred, and when in bed soon dozed off, but the sleep was much more ungenial than ordinarily. In the morning she complained that the chloral had not lulled the pain so effectually as usual, and that she felt more wearied. There was no nausea.

The chief points I wish to call attention to are, the sudden invasion of anæsthesia, and the danger of injury or of suffocation to the patient had she been alone; the fact that the dose was the same that had been taken for a long period, and therefore a dangerous result was the less to be apprehended. The cause of the unlooked-for occurrence was due to the vehicle, which favoured more speedy absorption than the syrup. The whole effect of the drug seemed to be expended in a single explosion, instead of, as formerly, being spread over a considerable period of time. The more tardy action of opium and other poisons when the stomach is full is well known. It would seem that in like manner the action of the chloral may be greatly modified if the conditions under which it is used are but slightly modified. —*Lancet*, *March* 4, 1871, *p.* 328.

97.—CHLORAL HYDRATE: ITS INCONVENIENCES AND DANGERS.

By Dr. J. Crichton Browne, Medical Director, West Riding Asylum, Wakefield.

[The tendency hitherto has been to exaggerate the merits of chloral. All diseases have been indiscriminately treated with it. A considerable experience of its use at the West Riding Asylum has shown Dr. Browne that there are not only inconveniences attending its use but sometimes not inconsiderable risks.]

When dwelling upon the evils of chloral, I would not be understood to overlook its real excellence. I am far from disputing its usefulness in that department of practice with which I am most familiar. I am persuaded that it has already proved an important adjuvant in the treatment of some mental diseases, and will take permanent rank as a valuable means of regulating nervous action. It is not my purpose here, however, to extol its usefulness, or to define the conditions for its employment. My object is to indicate some dangers which beset its administration, and to show that these are especially apt to be incurred wherever the nervous system is weak or disordered. From the proof of these propositions there will follow as inevitable corollaries that chloral ought never to be taken except under medical advice, and that it ought always to be prescribed with caution and judgment.

Soon after experiments with chloral were commenced in this asylum, in February, 1870, I noticed a singular tendency to flushing of the head and face in many of those patients who were subjected to its influence. It was no uncommon thing to find a pale anæmic patient, to whom chloral had been given, presenting at certain hours of the day a floridness of countenance which would have done credit to the rudest health. Of forty cases in which chloral was tried up to the month of June, and of which I possess notes, this blushing was remarked in nineteen, in greater or less degree; in a few suffusing only the cheeks, but in a much larger number involving the brow, neck, and ears, and assuming a depth of colour altogether *unusual in* the natural process. In one case, which is characteristic of *many, I find* it reported that half an hour after fifteen grains of chloral

had been taken, the face up to the roots of the hair and down to the ramus of the lower jaw was of a dull-scarlet colour, very persistent under pressure, most intense over the malar prominences and bridge of the nose, and thence shading off in every direction. The ears partook of the same colour, which was also scattered in blotches over the neck and chest, the lowest blotch being over the middle of the sternum, and the largest about the size of a florin. This singular flushed condition, which was associated with slight contraction of the pupils, injection of the conjunctivæ, and excitement of the circulation, continued for about an hour and then disappeared, during a paroxysm of sneezing and emotional perturbation, to recur after the next dose of chloral. Watchful observance satisfied me that this chloral-flushing rarely presented itself after a single or even several doses of the drug, but generally occurred where it had been taken regularly for some little time. When alcohol in any form was taken along with chloral, then its occurrence was much more certain; indeed, the combination of whisky with chloral in treatment came to be considered a sure method of producing it. Once fairly induced, it was not so easily got rid of. The chloral might be omitted, and still it would show itself, after meals, for a week or ten days, and for much longer if the use of chloral had been long continued. It was a source of annoyance to those patients who suffered from it and who were intelligent enough to express their sensations. They complained of burning heat in the face, of feeling "all of a glow," and often at the same time of a sense of giddiness, inability to walk straight or steadily, and confusion of thought.

In seeking for an explanation of this chloral-flushing, it of course suggests itself that there are several analogous states. We frequently meet persons who flush much after eating, or after sitting with their backs to the fire. We meet others who flush in a similar way after partaking alcohol; and it has been observed that malt-liquors are particularly prone to give this circumstantial evidence of their imbibition in those unaccustomed to their use. Some ladies suffer much from this flushing affliction. If they taste wine, "the sudden blush devours them, neck and brow." One lady of my acquaintance becomes so instantaneously crimson after the smallest modicum of wine, that she has been obliged to adopt total abstinence principles when dining out. Apprehension and trepidation have doubtless something to do with the flushing in her case, as she is exceedingly sensitive about the ruddy foible, the disfigurement which it produces, and the inferences to which it might give rise in the readers of the Saturday Review. But these are only pre-disponents after all, for the same thing occasionally happens in her own house in certain states of health. Now in all such cases the phenomena themselves, as well as the rapidity with which they follow the exhibition of their supposed causes, leave no reasonable doubt that they are essentially and directly of nervous origin. Brown Séquard's researches establish beyond doubt that flushing, such as we have been considering, must be attributed to temporary paralysis of the vaso-motor centres of the head and neck; while Lister's researches guide us to the conclusion that such vaso-motor paralysis is traceable to an inhibitory influence. Some peculiar or violent impression made upon the afferent nerves of the stomach and the minute ganglia with which they are connected originates an influence which is conveyed to the great sympathetic centres, where it becomes an embargo upon the control ordinarily exercised over the dimensions of the blood-vessels. Immediate dilatation of these vessels with afflux of blood follows in those parts where capillary movements are most habitual, and where there is constant exposure to the air. The range of operation of an inhibitory influence, such as that I have been referring to, will of course vary under various circumstances. It may be limited to a diminution or arrest of the vaso-motor functions of the sympathetic centres of the head and face; or it may diffuse its effects more widely, and this it will do in proportion to its intensity and frequency of repetition, and to the degree of enfeeblement or susceptibility of the nervous system generally. It may extend to the spinal cord, *medulla oblongata*, and neighbouring parts of the encephalon;

and this it apparently did in those cases to which I have alluded in which, along with the flushing of the head and face, there was impairment of muscular co-ordination and giddiness. It may also spread its effects over the whole cutaneous surface, as was illustrated in a case under my care in which a few doses of chloral brought on a sharp attack of urticaria, from which the patient had never previously suffered.

On the morning of Nov. 20th, 1870, E. R., aged thirty, ward 32, was noticed, about an hour after a dose of chloral, to be much flushed, and to present over her whole body a diffuse inflammatory redness so closely resembling the smooth eruption of scarlatina that it was thought prudent to isolate her in the hospital for contagious diseases. Here more characteristic symptoms were shortly developed. A number of long pale elevations, or wheals, showed themselves on the legs, shoulders and waist while similar ones could be produced on other parts of the skin by scratching. At the same time, burning, stinging sensations, and a feeling of tightness and hardness over the whole surface were complained of, along with wheezing respiration, sharp pains in the eyeballs, headache, and lassitude. A dose of compound rhubarb powder was administered, and in five hours thereafter (ten hours from the beginning of the attack) the skin had returned entirely to its normal state.

It is clear that in this case the chloral was the toxic cause of the urticaria. It acted just as various kinds of food are known to do in producing this cutaneous neurosis. It produced, firstly, general capillary hyperæmia, due to vaso-motor paralysis; secondly, spasm of the cutaneous muscular fibres, due to irritation of the motor nerves; and, thirdly, hyperæsthesia with modifications of sensory impressions, due to changes in the peripheral extremities of the afferent nerves, Its effects had advanced a stage upon that simple vaso-motor paralysis to which I first adverted.—*Lancet*, *April*, 1, 1871, *p.* 440.

98.—HYDRATE OF CHLORAL—ITS POSITION IN MEDICINE.

By R. Uniacke Ronayne, Esq., Youghal Infirmary.

An admirable advantage, incidental to the employment of chloral, is the non- suppression or retardation of natural secretions, the bowels, skin, and kidneys continue to perform their normal functions unaffected by it to any injurious degree. The only unpleasant effect produced on the healthy, alimentary system is the occasional slight dryness of the fauces at morning, which, however, a drink speedily removes, and in respect to the secretion of the kidneys, where we also find a slight deviation from this rule. Here, however, the disturbance seems equally trifling. The urine passed immediately after a chloral sleep reacts neutral and does not reduce the copper of Fehling's solution; but that voided some hours later is more dense and does reduce the copper of Fehling's solution, thus similating a temporary glucosuria; in other respects it is normal. I have never seen constipation caused by even its lengthened administration. On this subject, Dr. A. M. Adams speaks with confidence—"In head affections, where there is torpidity of the bowels and retention of urine, chloral does not, like opium, encourage this state of matters, but would seem, owing to some reflex action, whilst effectually overpowering undue nervous disturbance, to stimulate or assist the bladder and bowels to a more healthy action." This avoidance of any inclination to check the eliminative processes, causes chloral to be especially valuable in fevers where retrocession of these is sure to be attended by serious consequences. The administration of chloral is not followed by morning headache, nausea, nor disinclination to receive food. This sick headache is one of the most annoying followers of opium, and its absence from the track of chloral is an inestimable benefit; yet, further, I have seen some cases in which similar affections (though not arising from *any drug*) have been effectually removed by its exhibition, returning on its *remission*, and again departing on its restoration. So far from giving rise

to intolerance of food, the patient awakes bright, comfortable and refreshed; free from lethargy of mind or body, and having generally a better desire for breakfast than previously felt. This appetite is a curious result of the use of chloral, and I have so often observed it, and noticed the patients themselves comment on it, that I cannot help associating it as a special attendant on chloral action. The craving for the morning meal which it produces cannot be accounted for by the good night's rest and the absence of pain alone, and I have been particularly struck with the numbers long deprived by cachexia of a taste for food, who voluntarily rejoiced in their newly acquired relish for breakfast. Action of the skin, so far as I have observed, seems little changed by it, if anything, I fancy it lessens the sweating of phthisis, by quieting the general excitement, and causing contraction of the capillaries. These appear to me the ordinary phenomena which accompany and follow the presence of chloral, but it is also capable of developing well marked particular effects. Amongst the most advantageous of these seem to be the decided control it exercises over the irritable cough of bronchitis and phthisis. In many of these cases, opium is highly objectionable; conium useful, but uncertain; and hydrocyanic acid often next to worthless, unless given in dangerous doses. Here, chloral quickly gives rest, and renders the harassing cough less frequent and harsh. Dr. Taylor, writing to Sir James Simpson of its benefit, in a case of congestive bronchitis with hæmoptysis, says—"As I contrast the distressed and audible breathing of last night with the tranquil sleep and improved state of the patient to-day, I cannot help concluding that, chloral has a *directly sedative effect on the whole respiratory surfaces.*"

Besides this, I have noticed other and important therapeutic actions result from its use, not the least useful of which, is its power of diminishing the quantity and improving the quality of the sputa in the above-mentioned chest diseases; in such cases it not only controls the severity and lessens the hardness and frequency of the cough, but it also reduces the actual amount of expectoration in a remarkable degree, sometimes cutting it down by one-half or more in a single night. In every case of this kind, I have achieved a similar result; this I consider a most valuable power, as by it a world of restless, exhausting misery is spared the already over-taxed weakness of the invalid, and life is prolonged by the husbanding of such slight vital resources as he yet possesses. In asthma, the ability of chloral to avert and arrest spasm borders on the wonderful. In severe cases where the nocturnal paroxysms were excessive, keeping the wretched sufferer sitting up in bed gasping for breath, a timely dose taken on the approach of dyspnœa, has invariably warded off the attack, or, if it had already set in, relieved the spasm, permitted the recumbent posture to be resumed, and procured a quiet night's rest. Those to whom I have given it have derived more benefit from its use than from stramonium, ethereal tincture of lobelia, or other antispasmodics, especially favoured in such cases; it has been spoken highly of in pertussis, but on this point I cannot treat with experience. Dr. A. M. Adams, however, thinks highly of its value, and writes—"Where the cough is unusually severe, and likely in consequence to lead to other complications, it will prove a most valuable remedy—about six grains given only at bed time will in most cases ensure a comparatively quiet night." Perhaps, the most peculiar result which I have undoubtedly obtained from chloral administration, although I am at a loss to account for it physiologically, is its efficiency in arresting the disastrous colliquative diarrhœa of phthisis. Although, as I before observed, its habitual use does not tend to the production of constipation, yet I have several times by its administration stayed the vital torrent where mist. cretæ c. opio, vegetable astringents and sulphuric acid with opium had hopelessly failed. Of course, there are limits to such action, and I should have little faith in its good offices where ulceration had actually taken place, but, in the stage of tubercular irritations which precedes the breaking down of the mesenteric deposits, I have experienced decided success by its aid alone. Chloral may be used *with benefit in many forms* of irritable stomach. It almost always

calms that excitable organ, and even holds somewhat in check the obstinate vomiting of organic disease. I have been able by its means to procure many hours' rest, and tolerance of food for an ulcerated stomach, and I know of no other preparation for which I could say as much. It is possible that it might prove equally useful in the obstinate vomiting of pregnancy, and even become a respectable adjunct to the marine surgeons' nostrums against sea sickness. In various forms of irritability of the heart, as well as in valvular diseases of that organ, I have used chloral with satisfactory results. Although M. Bouchut says, "it increases arterial tension," I have found it relieve fluttering, and by checking the disposition to irritability, allay irregular action. In valvular disease, it appears also to do good by steadying the organ down to its work, and thus relieving laboured over action. Sir James Simpson has called attention to one most valuable property of chloral viz :—that of lessening the pains of labour without restraining contractions of the uterus. He observes,—"I have found the parturient uterus to go on contracting regularly and strongly when the patient was so deeply asleep under chloral, as to be only very imperfectly awakened up with the expulsive efforts of labour." Here, then, we find a much more convenient and safer companion in the lying-in chamber than chloroform, which latter can hardly be properly administered without the aid of a second medical attendant, a thing seldom attainable even in respectable private practice, and completely beyond the reach of the ordinary dispensary physician.

There is one disease of formidable aspect, about which, in connection with chloral, some controversy has arisen, I allude to the Sphynx of Medicine—traumatic tetanus. There are some very important cases of recovery on record where this agent has been credited with the cure; and that of M. Verneuil in the Lancet, April 16th, 1870, seems the most convincing. On the other hand we have statements equally reliable, charging it with complete inutility to meet such straits; but as one swallow does not make a summer, neither can one or two cases for or against establish a rule. The truth may lie on both sides. All forms of tetanus are as surely not to be cured by any one drug, or combination of drugs, as that no hand could raise a Tower of Babel. Whilst on the other side many of the failures may have fallen unjustly on the shoulders of chloral, as all practitioners meet occasionally with cases of constitutional idiosyncracies, where susceptibility to the action of some particular medicine is found wanting; and it is possible that amongst the unsuccessful ones such may be found. I have met but one peculiar case of this nature, where a man suffering from chronic rheumatic arthritis, took large quantities of chloral without its producing the smallest effect; whilst a patient in the next bed to him spent his nights in a pleasant oblivion derived from one-sixth the dose. I fancy the former's insusceptibility arose from a hyper-acidity of the system to which his disease made him liable. But should more extended trial prove chloral to have no power over tetanus, I still think that should not make us undervalue what it has actually done in the broad fields of medicine and surgery. Amongst the other ailments in which chloral has found favour, I may mention hysteralgia, dysmenorrhœa, hysteria, pleurodynia, gastralgia, and cancer. In irritable bladder and chronic cystitis, Sir James Simpson has seen "it give the patient much longer and more perfect rest than large doses of opium." Liebreich speaks well of its utility in rheumatism, convulsive coughs, acute mania, *delirium tremens*, and as a sedative after surgical operations; and Bouchut considers it the most prompt and efficacious remedy in intense chorea, where the life of the patient is threatened. It is as well to mention that I have seldom found it necessary to prescribe chloral in higher doses than from fifteen to forty grains, and that it is neither an accumulative medicine nor one which must necessarily be increased in quantity on repetition—the same amount which relieved pain, or produced a soporific action, this day month does the same to-day. Now, as to its toxic effects, it seems that the functions *acted on* by chloral are attacked in this order:—1. The cerebral; 2. The *voluntary* muscular; 3. The respiratory; 4. The heart; and it is only when

given in doses sufficiently large to induce a depressing effect on the last, that any threatening or fatal result is to be feared; and since the ultimate action of chloral and chloroform are similar, only that of the former is infinitesimally slower than that of the latter, it follows that poisoning by chloral must be more than proportionately rare.

Having thus endeavoured to illustrate the various uses to which chloral may be applied, it only now remains for me to express the conviction which a lengthened and impartial, even jealous, trial of chloral has forced upon me, namely—that it is by far the surest, safest, most efficacious, and least objectionable hypnotic which we possess; that it is far superior to opium in all the qualities which they hold in common, and in the absence of all the ill effects which the latter is capable of exercising, and that with the exception of such cases as rupture of the uterus, peritonitis, and such like, where opium's very vices are its best commendation, it is capable of completely supplanting that drug.—*Med. Press and Circular, Dec.* 28, 1870, *p.* 518.

99.—HYDRATE OF CHLORAL AS AN ANÆSTHETIC IN LABOUR.

By Dr. W. J. C. Du Hamel, of Baltimore.

At 4 o'clock P.M., September, 1870, I was called to see a lady in labour with her second child. The previous labour, three years ago, had been a tedious one, and the physician in attendance had finally to deliver her with the forceps. I found her in active labour, the os uteri dilating; and a few hours afterwards the os had become well dilated and the head presented; pains active. A few hours later very little progress had been made though the pains were still vigorous, and she now insisted on the instruments being used saying she *could not be delivered* otherwise. I declined to do so, but gave her twelve grain doses of hydrate of chloral every hour for *three hours*. It proved to be a most excellent anæsthetic in this case, and free from the dangerous effects of chloroform. After the *second dose* there was considerable *relaxation* of the parts, and in four hours after the first dose she was delivered of a fine child without the use of instruments, and with *very little pain*. I regard the chloral as a valuable agent in severe and tedious labours.—*American Journal of Med. Sciences, Oct.* 1870, *p* 574.

100.—ON NITROUS OXIDE GAS AND ITS USE AS AN ANÆSTHETIC.

By Dr. Maclaren, Carlisle.

[The position of nitrous oxide gas as an anæsthetic is now thoroughly established and its use rapidly extending. The gas is prepared by decomposing nitrate of ammonia with heat. If the heat employed is too great there is evolution of nitrous acid, and other disagreeable oxides of nitrogen.]

Nitrous oxide is a colourless gas having a very faint odour and a slightly sweetish taste. Its specific gravity is 1·525. It supports combustion, but in a minor degree to pure oxygen. The test of its purity is that a match lighted and then blown out should have the red ember brilliantly re-ignited on being plunged into it. The phenomena usually observed in the human subject when the gas is inhaled, are as follows: when it has been inspired two or three times there is an increase in the force and frequency of the pulse. In about twenty seconds, if the breathing has been steady and regular to begin with, it is also noticed to increase in frequency. This, however, from the commencement is often irregular, shallow, and rapid, from the nervous condition of the patient. In about thirty seconds the patient's colour begins to turn livid. When the gas has been continued for about one minute the pulse is almost invariably noticed to fall in force and frequency, the breathing is *often laboured*, sometimes stertorous, though I have several

times seen cases where it became feebler until the expiring valve was hardly raised; it was then either the case that the patient was completely anæsthetized, or, if not, the breathing commenced to improve in character. In the majority of cases, in one minute and twenty seconds the patient is over. This is known by different signs,—the one which is least open to mistake is a sudden change in the patient's appearance, which is difficult to describe, but readily recognised; another is a nervous twitching of the hands. It is not by any means necessary to carry the administration the length of this in every case, but when it is present for a few seconds the patient is quite insensible. In one case to which I gave the gas, this muscular twitching affected the whole body, resembling almost an epileptic convulsion; the patient was quite unconscious. The same dependence cannot be placed on the insensibility of the conjunctiva to touch as in chloroform cases. For from reflex action patients will close the eye on having it touched when they are quite insensible to pain, and, on the other hand, they will keep the eye steadily open sometimes when not unconscious. As in one of my early cases, where a patient complained that he felt the whole operation, I told him I could not understand how that came about, for when I touched his eye he gave no signs of feeling it. "Oh," he irreverently replied, "I felt you touch the eye, but I kept it open as I only thought it was part of the performance." It occasionally happens about the period of the removal of the face-piece that the pulse intermits a beat or two, and I have repeatedly seen the breathing stop, during a period equal to four or five respirations, at the time when the operation was commenced. It is very curious, and a fact which I have not seen noted by others, that the hearing remains acute frequently after the other senses are in abeyance; thus patients are able to repeat remarks made in their presence after they are apparently unconscious, and one young lady was able to repeat a hasty remark made by the operator, Mr. Warwick Hele, when a tooth broke under the forceps, although she did not feel its subsequent removal, and the observation was made in so low a voice that I did not catch what it was, though I was standing beside him. There often exists considerable muscular rigidity during the later stages of the administration; so in dental cases, before the apparatus is placed on the face a plug is fixed on the teeth to keep the mouth open, as some difficulty might be experienced in effecting this afterwards, and much valuable time be lost. These plugs are made of vulcanite, with the faces so cut as to catch on the cusps or between the teeth. I have administered the gas myself upwards of forty times, I cannot tell you exactly how often, for of my earlier cases I have kept no record: all the cases have been for the extraction of teeth or fangs. Since we used the time indicator mentioned above, Mr. Warwick Hele and myself have carefully registered the cases. They amount to thirty-seven; in seventeen of these he gave the gas, in the rest I gave it. The time taken to produce insensibility was as follows:—

Up to	1 m.	inclusive,	9
„	1 m. 20 sec.	„	17
„	1 m. 40 sec.	„	5
„	2 m. 0 sec.	„	5
„	2 m. 20 sec.	„	1

The shortest time was forty-five seconds; the longest, two minutes thirteen seconds. The greatest amount of work done has been four extractions of teeth or fangs, which has happened in several cases. It has never happened in my experience that a patient was restless or excited while the gas was being given; in a few cases with children it has been necessary to hold the hands to prevent them catching the apparatus, but there is never anything resembling the struggling so common during the excited stage of chloroform. Recovery is usually rapid and complete, the patient waking up as from a sleep. But it does sometimes happen, usually in young ladies between the ages of fourteen and twenty, that there is an intermediate stage between that of complete unconsciousness and recovery, when some excitement

is exhibited, such as tossing about restlessly in the chair and weeping, they, on recovery, being generally very much surprised to find themselves so doing. Out of the above-mentioned cases we have noticed seven to have been affected in this manner in a greater or less degree, three complained of slight giddiness or faintness, and one was a little sick. One patient, a boy, urinated, his father having declined to indulge his expressed wish to do it before the operation. In several cases the removal of teeth was felt, but unattended with pain. The longest period during which we have noted a patient to be insensible is one minute. The patient is always seated in the upright position, this being found not only to be the most convenient for the operator, but the safest for the patient, as it obviates the risk of the tongue falling back on the epiglottis, and the saliva flowing into the throat, which is apt to happen if the patient lies on the back.

It is a point of great practical importance not only to keep the room perfectly quiet during the administration, but also to leave the patients undisturbed until they thoroughly awake. From a neglect of this precaution, I believe, resulted the only case of considerable excitement that I have seen. It was my second case, and the patient during recovery exhibited all the symptoms described as attending the exhibition of the nitrous oxide as laughing gas, *i.e.*, mixed with some air. In regard to the sensations experienced by patients, the majority are able only to say that they have been unconscious, some that they have been asleep and dreaming, the dreams being often pleasant, sometimes more like nightmare; and lastly, some complain that they have had considerable annoyance from rushing or singing noises in the head. One little girl was immensely pleased with it; she said that "she felt as if she was being tickled all over." Unconscious reflex screaming is not uncommon with children during the operation; but it does not seem to be connected with any particular form of dreaming. I have not been in the habit of ordering a stimulant before the gas is taken, as is commonly done with chloroform. In the only instance in which I sanctioned such a procedure, the patient, a young, strong, but very nervous man, took one glass of undiluted brandy, and he suffered from headache for the rest of the day, which I thought might probably be due to the brandy, as I have never seen this sequent before or since in the same class of patient.

What is the physiology of the action of the gas? Sir Humphry Davy's researches led him to conclude that when breathed, and also when exposed to blood, a great part of it is absorbed, and that the residual gas is principally nitrogen. He believed, however, that the gas was not decomposed, but was absorbed only, and that the nitrogen was evolved from the blood. In regard to the residual gas being chiefly nitrogen Sir Humphrey seems to have been in error, for Dr. Hermann's observations, published in 1844, and quoted in the British Medical Journal of 18th April, 1868, are as follows: It neither enters into combination with, nor suffers changes from, nor produces changes in the blood, though readily soluble in it. A hundred volumes of blood at the temperature of the body will absorb somewhat less than sixty volumes of nitrous oxide; blood saturated with it shows no sign of change, the spectrum appearances are the same, the blood-corpuscles are unaltered, and the oxygen is not driven out. In the blood, and probably in the body, laughing gas suffers no change. It does not give up its oxygen for purposes of oxidation, and therefore gives rise to no free nitrogen; it leaves the body as it went in, pure and simple laughing gas. Hence it is of no respiratory use, and when mixed with a quantity of oxygen sufficient for the needs of the economy, has no more direct effect on respiration than has nitrogen or hydrogen.

Mr. Clover observes, "Nitrous oxide acts by preventing the oxidation of the nervous centres, principally by depriving the blood of its proper supply of free oxygen in the lungs. Although there is oxygen in the nitrous oxide, it is in a state of chemical combination with nitrogen, not free, and merely mixed with nitrogen as in the air. It is probable that the presence in the blood of nitrous oxide is exciting, so long as some oxygen remains, but as soon as the *oxygenating* property of the blood is lost, the functions of the

nervous centres fail; and if fresh air were not soon admitted, their functions would cease altogether. The functions of the brain proper cease before those of the medulla oblongata; hence we have loss of consciousness before failure of breathing, and the functions of the medulla are abolished before those of the ganglia presiding over the action of the heart, and hence the heart continues to beat after the breathing has ceased." To the practical importance of this last paragraph I would direct your attention, for it shows that after the breathing has ceased, the patient may be safe so long as the heart pulsates.

Dr. Richardson believes that this agent acts simply by producing asphyxia, and is therefore a most dangerous anæsthetic.

I do not propose to indicate my adherence to any of these theories, nor do I intend to propound a new one of my own, believing as I do, that we have up to the present time been indulged with rather too many theories, and too few accurate observations or facts. And in leaving this part of the subject, I would simply quote to you the words of a wise man—Sir Humphry Davy: "It would be easy," he says, "to form theories referring the action of blood impregnated with nitrous oxide to its power of supplying the nervous and muscular fibre with such proportions of condensed nitrogen, oxygen, light or ethereal fluid, as enabled them more rapidly to pass through those changes which constitute their life; but such theories would be only collections of terms derived from known phenomena and applied by loose analogies of language to unknown things." With some slight change of terms, would the remarks not as well suit our day as they did the beginning of the century?

Nitrous oxide has been chiefly used as an anæsthetic in dentistry, and seems eminently suited in every respect for this work. In general surgery, cases are recorded in which, by alternating it with air, insensibility has been kept up for eight minutes, twenty minutes (Dr. Marion Sims), sixteen minutes (Dr. Colton), and in this country, eight minutes thirty seconds (Dr. Begg), twenty minutes (Mr. Fox).

The advantages which I conceive it possesses as an anæsthetic are,—1st, Its safety. It has now been given for six years in America, and for two in this country, and a vast number of patients have been submitted to its influence, and there have been only two fatal cases recorded, both in America. In one of these the patient's lungs were found "riddled with tubercles" when a post-mortem examination was made; and in the other, the cork which was used as a plug to keep the mouth open, was found in the pharynx. It this respect, it compares favourably with chloroform and bichloride of methylene. 2nd, The absence of troublesome after-effects. It is only in very rare cases indeed that any complaint of sickness or faintness is made at any length of time after its use. I believe that the most prolonged inconvenience I have met with, was a headache, lasting the rest of the day; and patients have been always able to leave the operating chair and walk away within ten minutes of an operation. 3rd, The rapidity of administration. Time, often valuable time, is saved to all concerned. 4th, The position. This applies principally to dentistry, where the sitting is a much more convenient position than the recumbent. 5th, there is nothing unpleasant in the smell or taste of the gas itself, and it can be inspired and expired freely; it does not cause any choking feeling or spasm of the glottis. Its disadvantages are,—1st, Rapidity of recovery from a single administration; insensibility does not last over one minute or one and a half minutes. 2nd, It is somewhat troublesome to administer; it requires close attention and a little practice to be able to give it with facility. 3rd, The apparatus for making and administering it is costly. Until about six months ago, I should have had to state that a serious objection to its use was the trouble of making it, and its inconvenient bulk for carriage. But the gas can now be procured compressed into the liquid form, and thus reduced to small compass. This, however, costs in London twice the price of the home-manufactured gas, and, I am told, makes so much noise when escaping as seriously to discompose patients. I have no doubt that in a

short time the gas and apparatus will be much less costly, and that it will come into very general use in minor surgery. I believe that it will be habitually given in cases in which we never use an anæsthetic now, save under very exceptional circumstances, as in using the potential cautery, opening small abscesses, and in applying painful dressings, and that it will supersede chloroform in all operations not lasting over one minute. As to the cases in which it would be unsafe to give this anæsthetic, evidently those in which phthisis exists deserve the first place, for one of the deaths recorded above was attributed to this cause, and other cases are mentioned in which hæmoptysis occurred. From the frequency of a laboured or panting condition of the breathing during the later stages of administration, I think its use is to be avoided in the case of all diseases of the lungs causing serious impairment of the breathing, as chronic bronchitis, emphysema, and pleural effusion. Acute chest diseases I do not mention, as there is but little likelihood of the question of gas administration occurring during their course. In heart disease, it has been knowingly given without producing death, and with only temporary aggravation of symptoms. It has been given in such cases after the patient had been prohibited from taking chloroform. I do not think that such cases are free from danger, and I believe it should only be given in them when the result to be attained is such as to justify some risk, as where an operation was a necessity, and its performance without an anæsthetic seemed likely to endanger the patient's existence. Leaving out of consideration insanity, I do not think it would be advisable to give it where there was evidence of brain disease.—*Edinburgh Medical Journal, Jan.* 1871, *p.* 591.

101.—THE ADVANTAGES OF BICHLORIDE OF METHYLENE.

By Charles Gaine, Esq., Surgeon Dentist to the Royal United Hospital, Bath.

In April last I read a paper before the Bath and Bristol branch of the Bristol Medical Association on "Anæsthetics," and in it endeavoured to explain the advantages which, from repeated experiments, I thought the "bichloride of methylene" possessed over all others then known. Since that time I have administered it in a great number of operations, not only in my own special practice, but also for my colleague, Mr. Stockwell, at the Royal United Hospital, and in private practice, with the most marked success; notably in the following operations:—Lithotomy, reduction of dislocations, fistula in ano, recto-vesical fistula, resection of knee-joint, amputation of leg, excision of mamma, necrosis, cataract, iridectomy, &c.—the oldest person operated upon being a woman aged 70; the youngest, a child, aged 6 years. The shortest time in which anæsthesia was produced was twenty seconds, in a child, to sound for stone in the bladder; the longest, two minutes and a half, in a man, aged 24, for extraction of teeth —the shortest time which anæsthesia was maintained being forty seconds; the longest thirty-five minutes. The recovery has always been rapid and complete.

I first administered the bichloride of methylene in some half-dozen cases in 1868, but discontinued its use, because I found it less manageable than chloroform; the cause of my failure then, I have since discovered, was the admission of too much air in administering it. I subsequently employed the protoxide of nitrogen in my own practice, but the peculiar physiological phenomena exemplified in using this gas never impressed me so much in its favour as it has many others.

In January, 1870, I read a paper by Mr. Bader, of Guy's Hospital, published in the British Medical Journal of January 9. "On the Administration of Chloroform and other Anæsthetics." In this paper the cause of my former failure with the bichloride was fully explained. I therefore resolved to give it another trial: and to the courtesy of my friend Mr. W. R. Wood, of Carlisle House, Brighton, and Mr. Rendle, of Guy's Hospital, I am in-

debted for some valuable information as to the manner of administering it, and to the latter gentleman for a description of his inhaler also. This inhaler I have found to answer the purpose admirably. It consists of a hollow cylinder made of thick leather, about five inches long, and shaped at one end to fit the nose and chin, the other end having small holes punched in for the admission of air. It will be necessary to have three different sizes, as the efficacy of inducing rapid anæsthesia with the bichloride of methylene depends on the inhaler accurately fitting the nose and chin, so as to prevent the admission of air at that end. A flannel bag hangs loosely within the cylinder, on which the methylene is sprinkled.

The following rules I have found of great importance, and the strict observance of them will tend greatly towards success in the administration of this agent:—It should never be administered without first preparing the patient. Abstaining from food and stimulants of every kind should be insisted on for from three to four hours before the time appointed for administering it; all garments should be loose. Auscultation not revealing any morbid condition to contraindicate its use, the methylene may be administered in the following manner:—The patient being either in the recumbent or semi-recumbent position, forty minims should be sprinkled on the flannel bag, and the inhaler then applied closely over the nose and mouth. A slight choking sensation will be first apparent, which passes off rapidly; if not, remove the inhaler for an instant. In from half a minute to a minute (seldom longer) anæsthesia of the eyeball is complete, though it will continue to roll about, showing more of the sclerotic than usual. The operation may then be commenced. Remove the inhaler entirely, until symptoms of returning consciousness are seen, when, if the operation is not completed, renew the inhalation with half a drachm more methylene; in a few seconds the inhaler may be again removed. In this manner, by proper attention to symptoms, a patient may be kept under its influence for any reasonable time. Should the operation be of short duration, from forty minims to a drachm of methylene will suffice for most cases. With two drachms and a half I have kept a patient under it for thirty-five minutes for resection of the knee-joint. I have not had a single case of vomiting, and two cases only that gave me the least uneasiness, and these had both departed from the rules laid down as to stimulants, &c.

To relate a number of cases would only occupy your valuable space for no useful end, but the following extracts from my note book may not be uninteresting in comparing the effects of methylene with chloroform and protoxide of nitrogen on patients who had inhaled one or other of these agents before. In January last I was consulted by a clergyman who, some five years since, had on three different occasions inhaled chloroform for removal of teeth. My friend, Mr. Fowler, who administered it, told me, that each time he had the greatest difficulty in getting him under the influence of it, and he was always prostrated for nearly a week after it. It was necessary to remove some particles of necrosed bone in the upper jaw, and puncture a deep-seated cyst. This was accomplished under the influence of one drachm of methylene, and in three minutes from the commencement of the inhalation he was sufficiently conscious to converse with us, and inquire what had been done. He walked away a few minutes after, and has not subsequently felt the slightest ill effects.

A young lady had inhaled "protoxide of nitrogen" in London for tooth extraction. The first upper and lower molars on the left side were extracted; the corresponding teeth on the opposite side were broken in the attempt. It was necessary, for regulating purposes, to remove the stumps. She asked me to give her chloroform; she said she would not take gas again. Methylene was administered, and the stumps removed, and in five minutes she walked away without feeling any inconvenience.

In the case of a woman, from whom it was necessary to remove all the remaining teeth (twenty-two in number), I administered protoxide of nitrogen; she was so uproarious, and subsequently became so blue with stertorous breathing, that I was only enabled to remove three teeth. A week

later, I removed the remaining nineteen under methylene at one sitting, seventy minims only of the bichloride being used. A quarter of an hour afterwards she walked home, feeling no ill effects, further than the loss of her teeth. Very many similar examples could I mention, but, as I have said, no useful purpose will be served by so doing. Let it suffice that, in relating my success with the bichloride of methylene, I have confined myself entirely to what I have observed in administering this agent, and I am alone responsible for any short-comings in this respect. It is equally useful in long as in short operations, and only requires to be more generally understood to give it precedence over all anæsthetics yet known.—*Medical Times and Gazette, Feb.* 25, 1871, *p.* 232.

102.—BICHLORIDE OF METHYLENE (CHLORO-METHYL) IN GENERAL SURGERY.

By T. Spencer Wells, Esq., Surgeon in Ordinary to Her Majesty's Household, and Surgeon to the Samaritan Hospital.

[The following short article is part of a letter to the Editor of the Lancet in consequence of its having been stated that chloromethyl is not an agent "of very extensive utility," nor likely to supersede the use of chloroform in general surgery. Mr. Wells's experience is the very reverse of this.]

The first surgical operation in which chloromethyl was ever used was a case of ovariotomy, which I performed in October, 1867. It was administered by Dr. Richardson himself, and in his report to the British Association in 1868 he says:— "After subjecting myself to the action of the vapour to the production of perfect insensibility, I ventured to administer it for surgical purposes on the 15th of October last. The sleep produced was of the simplest and gentlest character, and the operation, performed by Mr. Spencer Wells, which lasted thirty-five minutes, was quite painless."

This was my 229th case of ovariotomy. I have now done 417, and, with the exception of about ten, where, for some reason or other, chloroform was used, chloromethyl was the anæsthetic employed in every case, about 180 in number. In some 25 other cases of gastrotomy, and in more than 50 operations of more or less severity—such as herniotomy, amputation of the breast, removal of mammary or other tumours or of hemorrhoids, and plastic operations for the cure of vaginal fistula or ruptured perineum—chloromethyl has been administered for me either by Dr. Richardson himself or by my colleagues, Dr. Junker and Dr. Day. In very few of these operations was the condition of insensibility to pain maintained for less than five minutes. In a few it was kept up from forty-five minutes to an hour or more, and I should think the average would be about fifteen minutes. Yet I have never been at all uneasy in any one of these cases, more than 250 in number, either during the administration of the anæsthetic or from any subsequent ill effects fairly referable to it. Whereas, with chloroform I never felt quite at ease; and, although I never lost a patient during operation, I have three times had to resort to artificial respiration, and I have very often seen patients suffer so much from chloroform-vomiting for many hours after operation, that the result has been imperilled, and in some cases a fatal result has been in a great measure due to the vomiting. It is quite true that chloromethyl has also "the disadvantage of causing nausea and occasional sickness;" but in my experience this is almost the rule with chloroform, whereas with chloromethyl it is certainly exceptional.

When I add that between April, 1870, and March, 1871, I had thirty-two successive cases of ovariotomy in private practice without one death, every patient having recovered, it must be admitted (as anæsthesia was complete in every case, not one patient having been conscious at any stage of the operation) that the anæsthetic employed is a good one. In some cases less than two drachms was used, and very rarely more than six drachms. Dr. Junker's apparatus was generally employed, and Mr. Krohne tells me that many practitioners on the continent, in America, and in different parts of our own

country, who have ordered it from him after seeing it in my practice, have used it without difficulty, and have been well pleased with the results.—*Lancet, April* 29, 1871, *p.* 591.

103.—ON THE EFFECTS OF THE PROLONGED USE OF MORPHIA BY SUBCUTANEOUS INJECTION.

By Dr. Francis E. Anstie, Senior Assistant Physician to Westminster Hospital.

[There is no doubt that the morphia syringe has been greatly abused. This has arisen to some extent from a non-appreciation of the distinction between a stimulant and a narcotic dose of morphia, as explained in this paper.]

That there is a special state of chronic narcotism induced by the continued repetition of *large* hypodermic doses of morphia is a fact familiar to many physicians. It differs strikingly from that which results from the persistent abuse of opium or morphia taken by the mouth, in the slighter effects which it produces on consciousness, and especially in the fact that it usually scarcely impairs, if indeed it does not decidedly increase, the activity of appetite and digestion; hence it is far more consistent with the active performance of the duties of life, and with the maintenance of general bodily nutrition; and so far it must be considered as a much smaller evil than the constitutional habit induced by the old-fashioned forms of opium-excess. But it is quite as fatally effective as the latter in weaving a chain of habit from which the patient can either not escape at all, or can do so only by great efforts involving the prolonged endurance of much distress. It is certain, then, that the physician can only be justified by very special circumstances in allowing such a condition to be set up in any patient under his charge. Fortunately I am enabled to say, from a large experience, that it is only in rare instances that we are reduced to this necessity.

There are, in fact, three degrees of the action of morphia, hypodermically injected, which differ from each other in essential particulars: (1) that induced by small purely stimulant doses, given only once or twice, or repeated at intervals of twelve to twenty-four hours for a shorter or longer time: (2) somewhat larger doses, gradually reached, and repeated with some frequency over a considerable period; (3) large doses, repeated daily or oftener, requiring to be continuously augmented, and often continued, of necessity, throughout the remainder of the patient's life. The first two of these degrees of action are the only ones which, in the great majority of cases, the physician ought to employ.

1. The hypodermic use of purely stimulant doses of morphia is of wide application, and of a value which it is difficult to exaggerate. In the intense pains of the early stages of acute serous and fibrous inflammations; in the early stages of neuralgias; in the insomnia and delirium of many adynamic fevers; in phagedænic ulceration; in the dyspepsia of nervous irritation; and also in some cases of decided catarrhal inflammation of the alimentary mucous membrane, this kind of administration of morphia produces effects superior to anything which could be obtained before its introduction. Let it be clearly understood what is meant by purely stimulant doses of morphia. I mean such doses, whatever their exact amount (and this may range from $\frac{1}{12}$ to $\frac{1}{4}$ grain, in different subjects and varying circumstances), as produce relief of pain, natural sleep, and cessation of delirium, which check excessive epithelium growth on mucous membranes, and stimulate the repair of ulcerated parts, *without producing either stupor, contracted pupil, or subsequent constipation of bowels or burning of tongue.* Here is no vestige of *narcotic* action; and, after the disappearance of the immediate effect, there is no depression, no indescribable uneasiness, no yawning or sighing, no craving for the repetition of the dose. So long as such doses, only, are administered, and are administered only for the definite purposes *above* named, no opium-habit is set up; the patient can discontinue the *injections* the moment that the special need for them has ceased, without

the least inconvenience. This constantly happens, for example, in the acute stage of pleurisy; again, in acute rheumatism I have never observed this kind of use of the syringe to prolong the state of enfeeblement and of liability to recurrence of pain in the manner which Dr. Allbutt describes. I think I shall be able to show, presently, how those unfortunate results are probably produced.

2. There is a second grade of hypodermic morphia action which we are all occasionally obliged to employ, but which is also very frequently induced quite unnecessarily, and with objectionable effects. The small purely stimulant dose of morphia will not always suffice to effect our object. That object may be, for example, to relieve, with all speed, a pain so violent as to be directly depressing in a mischievous or even dangerous degree. Even here it is our duty, in the first instance, to try the small dose, and it is surprising how often it will succeed: but in a certain number of cases it will quite fail; and we must then frankly acknowledge to ourselves that it will be necessary to *narcotise* the patient to a certain extent. We then administer such a dose (*e.g.* ¼ grain or more) as will quickly produce some stupor and contraction of the pupil. Now if the course of the illness be such that this process has to be at all frequently repeated, we soon discover that our weapon is two-edged: the morphia-habit, already described, becomes fully developed, and, whatever else may happen, we may be sure, at least, that we shall have considerable trouble afterwards in inducing the patient to give up the medication. But a more substantial evil is sometimes produced. If the temporary mischief, to remove which we have consented to the induction of narcotism, be not conquered by a very few narcotic doses, there arises a new condition of things. Narcosis, it can never be too frequently repeated, is *a depression of nervous life*. At first this depression is so slight and temporary that (in vulgar parlance) it is spoken of as merely "functional," though, assuredly, alteration of function is never without its correlative in modification of tissue. From a few such temporary depressions of its life the nervous system has sufficient recuperative power to recover quickly and completely; but if the morbid process be repeated too frequently and too strongly, there is no such recovery, or only a partial one. The outcome of such a series of actions is, that the nervous system enters upon a new kind of physiological life, in which it is unable to work harmoniously without the constant presence, in the blood that feeds of it, of a calming and regulating agent like morphia.

3. This kind of evil reaches its highest development in those unhappy cases where, from one cause or another, an individual has long adopted the habit of using large doses of morphia every day or more frequently, and has now come to employ a very large daily allowance of the drug. Such a state of things may have arisen from mere wanton indulgence on the patient's part, or it may have been induced by the ever-present agony of an incurable malady (such as neuralgia of the worst type, or malignant disease), and the medical attendant may have been reluctantly compelled to acquiesce in a medication which he must nevertheless deplore. The injurious effects of this kind of habit are plainly perceptible in the general enfeeblement of nervous power of all kinds: the intellect and (even more strikingly) the moral energy steadily decline in power; but the most notable downward tendency is, after all, on the side of the sensory nervous system; for although temporary relief to pain can always be procured by a sufficiently large dose of injected morphia, the tendency to renewal of the pain becomes more and more pronounced, and a notable degree of hypersensitiveness to trivial sources of irritation becomes more and more apparent from day to day and from week to week. Moreover, if the injection be now omitted, the pain returns with an agony incomparably more severe than that which would attend the disease when uncomplicated by the results of the prolonged use of morphia. Besides the effects visibly and directly produced through the nervous system, there are changes of nutrition in the tissues; at least I am under a strong impression that a particular kind of muscular atrophy, which especially attacks the facial muscles, is one of the results of

large and long-continued doses of hypydermic morphia. This effect, I believe, is also observed in ordinary opium-eating, and gives rise to the curiously *lined* appearance of the face, which is different from the results of simple emaciation as is also another occasional symptom, the deposition of a considerable amount of brown pigment in the skin of the face.

The three degrees of action of hypodermic morphia above described certainly represent very different physiological facts, and they are no less different in their practical relations to treatment. Let me insist, first of all, on the narrow limits within which, alone, the physician ought to tolerate the third or highest degree of the medication. Considerable experience has convinced me that there are only two kinds, even of incurable pain, in which we really need yield to the tendency to increase the daily dose to a very high point: the pains, namely, that are produced by steadily progressive *ulcerative* processes involving nerves, or by continuous and increasing *pressure* on nerves from a tumour (cerebral tumour affording, perhaps, the most exquisite examples of this last). I particularly wish to say that, in my belief, the necessity need never arise in chronic incurable *neuralgia* if the medication be properly managed from the first. Having been much engaged in the treatment of neuralgic affections during some years past, I have had occasion to hear the past history of several patients who, when they first came before me, had already arrived at the daily use of very large hypodermic doses of morphia; and, without exception, I have found that their medical attendants had commenced the hypodermic treatment by doses which were unnecessarily large for that stage, and which, in fact, from the first always produced considerable narcosis. Now, in treating my own cases, I have found that this practice is not merely superfluous, but that it ought to be avoided, as it is sure to produce needless mischief; and I shall here give a typical example of the way in which I have been gradually led to treat the class of cases now referred to.

The patient is a lady in advanced life, who some seven years ago was attacked, for the second time, with sciatica. The first attack had occurred some thirty years previously: the malady was then extremely severe and obstinate, but at length departed, leaving her free from anything like localised neuralgia until the commencement of the illness from which she still suffers, and the immediate exciting cause of which was anxiety of mind. This lady is herself of a highly nervous and emotional turn, and comes of a family in whom the emotional and æsthetic mental temperament has always been conspicuous. One fact in her case deserves particular record, as showing the extraordinary power which nervous *commotion* exerts over her organism. She has always had abundant hair: this was bright brown in her youth, but comparatively early in middle life it began, under the influence of repeated anxieties, to turn grey. But the remarkable circumstance (which all her friends can verify) is that, without the falling out of a single hair, the whole mass would fluctuate backwards and forwards between brown-grey, iron-grey, and almost snow-white, in the course of a few weeks or even days, according as her mind was calm or disturbed. Even now, though the hue is far more permanently grey than it was a few years since, there are considerable fluctuations from time to time, according to the state of her nervous system. The sciatica was from the first very violent and intractable, and unfortunately the patient was unable or unwilling to take that prolonged and complete repose in the recumbent posture without which no sciatica, certainly no genuine and severe sciatica occurring in advanced life, can be cured. The consequence was that all hope of cure had at length to be abandoned, and mere palliation, by morphia, was the best course remaining open. For some time the patient took the drug by the mouth (½-grain doses), as I did not see my way to providing her (in a strictly country place) with the means of daily hypodermic injection. However, about three years since, I overcame these difficulties, by carefully instructing her servant in the use of the syringe. I commenced with either the $\frac{1}{10}$th or $\frac{1}{12}$th of a grain (I am not quite sure *which*, but remember distinctly the surprise of finding that so small a

quantity produced twenty-four hours' complete immunity from the pain); and notwithstanding the daily use of the injection up to the present time, we have only increased the dose to ¼ grain, at which point it seems likely to stand for some time to come. It is difficult, without using language that would sound extravagant, to indicate the value which hypodermic morphia has had for this lady. The agonising sciatic pain was shattering her whole nervous system, and her general health was in grave danger of a fatal collapse, when we commenced it. Since she has used it, she enjoys a great deal of calm happiness, her mind is active and clear, though her emotions are still very easily excited; she has comparative, though not complete, immunity from pain, and her general nutrition is unquestionably in a very good state for her time of life.

It is very interesting to analyse and estimate, in this patient, the truly narcotic effects; for such they are, though they are not a minimum, in consequence of the strict economy with which the morphia has been used. There is *very slight* contraction of the pupil observable during two or three hours after the injection. There is occasionally a slight excess of sleepiness, making it rather difficult for the patient to rouse herself in the morning; and towards three o'clock in the afternoon (about two hours before the usual time for injection) the beneficial influence of the morphia has usually given way, not (save exceptionally) to positive *pain*, but to the indescribable sense of depression which Niemeyer's patients so graphically represented to him by the phrase "katzenjammer." This feeling disappears almost immediately after the injection, the patient enjoys her dinner, is lively and conversational during the evening, and goes to bed at 11, or later, to enjoy, most commonly, what would be considered a very good amount of sleep for a person of her age. In fact I see no reason to doubt that, if preserved from fatal acute disease, this patient has many years of a by no means unhappy or unfruitful life before her; certainly not free from suffering, but with no unendurable suffering. Whereas I cannot doubt that, but for the medication, she would now have been far advanced towards fatal exhaustion, if, indeed, that point had not been already reached.

There can surely be no doubt that such a method of employing the hypodermic injection as the above is perfectly legitimate. Granting fully that we have here a fully formed morphia-habit, difficult or impossible to abandon, it does not appear that this is any evil, under the circumstances. I would even venture to say that, for elderly persons afflicted with an incurable painful disease, such a result of treatment affords an ideal of what we could desire.—*Practitioner*, *March* 1870, *p.* 148.

104.—BAIN'S AND PACINI'S METHODS OF RESTORING SUSPENDED ANIMATION.

Report of the COMMITTEE OF INVESTIGATION appointed by the Royal Medical and Chirurgical Society.

[The inquiry was pursued by means of experiments upon the dead human body. Four subjects were placed at the disposal of the Committee by the authorities of St. George's Hospital, by which means they were enabled to make eighty-three observations.]

Method of investigation.—In order to ascertain the relative merits of the two methods referred to the Committee, not only to each other, but also to other methods already in use, they were contrasted with the plan proposed by Dr. Silvester, the three modes being employed alternately on the same subject. In some of the experiments the operator was the same in all three classes of cases; in others, the Committee had the advantage of seeing Dr. Silvester and Dr. Bain perform their own experiments in the manner advocated by themselves.

The means which were employed to ascertain the actual quantity of air alternately introduced into the respiratory cavity and expelled therefrom by

the several mechanical expedients was the instrument designed by Dr. Sanderson, and employed by a former committee of the Royal Medical and Chirurgical Society appointed to report on the subject of suspended animation. In all the experiments the apparatus was directly connected with the trachea.

The mode in which artificial respiration is performed in the two methods under investigation is thus described by their respective advocates.

Professor Pacini describes his plan in a pamphlet, entitled "Di un nuovo Metodo di Practicare la Respirazione Artificiale," as follows:—"Supposing that the asphyxiated patient is on a horizontal plane above the ground, as a bed or a table, the operator stands with the head against his own abdomen, and then with his hands takes a firm hold of the upper part of the arms, applying the four fingers behind and close to the armpit, while the thumb is in front of the head of the humerus. Having thus seized both shoulders, he then pulls them towards him, and then lifts them in a perpendicular direction, by which means the sternum is first raised by means of the clavicle and, in consequence, the ribs, which, diminishing their obliquity with the spine, enlarge the thoracic cavity both in its transverse and antero-posterior diameters. If the patient is lying on the ground, it is easy to understand that the operator may then place himself on his knees so that the head may remain firmly placed against them. It is, however, necessary to explain that, in order to effect more fully the elevation of the chest, the rest of the body should not be allowed to yield to the traction, but should be fixed; so that, when the weight of the body does not offer sufficient resistance, an assistant should use counter-extension by holding the feet or by fastening them to some immovable object."

Dr. Bain thus describes his method:

"The patient being laid on his back on a table, if convenient, the mouth and nostrils are to be wiped dry, the clothes from the upper part of the body, at least, having been removed. The operator stands at the head of the patient, placing the fingers of each hand in the axilla in their front aspect, with the thumbs on the clavicles, and pulls the shoulders horizontally towards him with a certain degree of power. Upon relaxing his pull the shoulders and chest return to their original state."

Dr. Bain also occasionally employs another plan, which he terms his "second method," and which he thus describes:

"The shoulders are elevated by taking hold of the hands and raising the body about a foot off the table, the arms being elevated at an angle of 45° over the head."

The following are the results of the observations:

June 23rd, 1869.—*At St. George's Hospital.—Present.*—Dr. Sanderson, Dr. Bain, Mr. Savory, Mr. Power, Mr. Gascoyen, and Mr. Pick.

SUBJECT I.—A well-formed woman, aged 56, who had died of obstruction of the bowels, and who had no disease of the lungs. Had been dead twenty-one and a half hours.

Observation 1.—Dr. Silvester's method. Body lying flat on the back, with the head resting on the table. Elevation of both arms was attended by the introduction of 18 cubic inches into the lungs. On replacing the arms to the side 18 cubic inches of air were expelled from the lungs.

Obs. 2.—Repetition of the above. On elevation of arms 20 cubic inches were inspired. On restoration of arms to side 22 cubic inches were expired.

Obs. 3.—Repetition of the above. On elevation of the arms 20 cubic inches inspired. On restoration of arms to side 20 cubic inches expired.

Obs. 4.—Dr. Bain's method. The body lying flat upon the back. The shoulders were firmly grasped and drawn upwards in the direction of the ears. This was attended by the introduction of 26 cubic inches of air. Upon allowing the body to return to its natural condition 26 cubic inches were expired.

Obs. 5.—Repetition of Experiment 4. On elevation of the shoulders 24 *cubic inches* were inspired. On return of the body to its natural condition *24 cubic inches* were expired.

Obs. 6.—Repetition of Obs. 4 and 5. During the inspiratory process 26 cubic inches were introduced into the lungs. During the expiratory, 26 cubic inches were expelled.

Obs. 7.—Dr. Silvester's method. Repetition of Obs. 1, 2, 3. The elevation of the arms was attended with the introduction of 21 cubic inches into the lungs. Upon replacing the arms to the side 21 cubic inches were expelled.

Obs. 8.—Upon repeating this experiment 22 cubic inches were introduced, and 22 cubic inches expelled.

Obs. 9.—A third repetition of the experiment was attended by the introduction of 23 cubic inches, and the same amount was expelled.

Obs. 10.—Dr. Bain's method. Repetition of Experiments 4, 5, 6. During the inspiratory process 29 cubic inches were taken into the lungs, and 28 expelled from them during expiration.

Obs. 11.—Upon repeating this experiment 25 cubic inches were introduced and 24 expelled.

Obs. 12.—A repetition of Obs. 10 and 11 was attended with the introduction of 26 cubic inches and the expiration of 25 cubic inches.

Obs. 13.—Dr. Silvester's plan. The shoulders of the subject were now raised by placing a block under the chest and the head thrown back. Elevation of both arms in the same manner as in the first experiment was attended by the introduction of 27 cubic inches of air into the lungs. On replacing the arms to the side 24 cubic inches were expired.

Obs. 14.—Repetition of Obs. 13 was followed by the introduction of 24 cubic inches and by the expiration of 23.

Obs. 15.—This experiment repeated produced 23 cubic inches during inspiration and 24 cubic inches during expiration.

Obs. 16.—Dr. Bain's method. The subject being placed in the same position as in the last three experiments, with the shoulders raised. During the inspiratory process 25 cubic inches were introduced; during the expiratory 24 cubic inches were expelled.

Obs. 17.—Repetition of the last observation. The inspiratory process was attended with the introduction of 24 cubic inches, and the same amount was expelled during the expiratory process.

Obs. 18.—On the third experiment the amount introduced was 25 cubic inches; the amount expired was 24 cubic inches.

Obs. 19.—The last three experiments were repeated, Mr. Power (instead of Dr. Bain) performing them. Inspiration was attended with the introduction of 27 cubic inches. During expiration 26 cubic inches were expelled.

Obs. 20.—Upon repeating Obs. 19, 26 cubic inches were inspired, 25 were expelled.

Obs. 21.—A repetition of this produced 27 cubic inches inspired, 26 expelled.

Obs. 22.—Pacini's method. The method recommended by S. Pacini was now tried. In the first experiment (performed by Dr. Bain), during the inspiratory act 16 cubic inches were introduced into the lungs; during the expiratory act 16 cubic inches expired.

Obs. 23.—Upon a repetition of this experiment 20 inches were inspired and 20 expired.

Obs. 24.—This repeated produced a result of 21 cubic inches introduced during inspiration and a like amount expelled during expiration.

Obs. 25.—These last three experiments were repeated, another gentleman (Mr. Power) performing them. During the inspiratory act 34 cubic inches were introduced; during the expiratory 30 cubic inches were expelled.

Obs. 26.—This repeated produced during inspiration 32 cubic inches introduced; during expiration 32 cubic inches expelled.

Obs. 27.—On a third experiment, the introduction of air was 32 cubic inches; the amount expelled was the same.

Obs. 28.—Dr. Bain's second method. One experiment was performed. This produced during inspiration the introduction of 31 cubic inches of air; during expiration 30 cubic inches were expelled.

[Several other experiments were tried, and in various ways. The paper ends with the following practical *conclusions.*]

From these experiments it appears that more air is introduced as a rule by traction from the shoulders than from the forearms and arms. Nevertheless it will be seen that in the amount of air introduced there is a greater difference when the same method is adopted with different bodies than there is between the two plans when practised upon the same body—this great difference being chiefly due to the size of the body, especially the amount of the mobility of the walls of the chest, and the rigidity of the muscles.

By either plan the Committee are of opinion that a sufficiently large quantity of air is without difficulty introduced. And it may be observed that in either case on an average more air is changed than in the act of ordinary tranquil respiration.

In estimating the relative merits of the two plans they are anxious to observe that other considerations are involved than that of the absolute and comparative quantity of air changed.

They are unanimously of the opinion that the method advocated and practised by Dr. Bain is but a modification of the plan usually known as Silvester's, and involves no new principle of action. Indeed, in his more recent publications, Dr. Silvester has not limited his point of traction to any one part in particular of the forearm or arm. They are, therefore, of opinion that in the great majority of cases it is of comparatively little moment which method of manipulation is practised, provided the common principle on which both are founded be fairly carried out.—*Medico-Chirurgical Transactions*, 1870, *p.* 291.

105.—ON DEATH BY DROWNING AND COLD.

By Dr. Benjamin W. Richardson, F.R.S.

I have taken advantage of the late extremely cold weather to institute a new series of researches on death by drowning in water at 32° F. This is the season in which such inquiries can only be satisfactorily carried on in our country, and it is the season, also, in which accidents occur that call forth our special curative skill. The study, consequently, is both practical and philosophical, and I do not know in which of these directions it is most absorbing. To be able, by any line of study, to see the way more clearly towards lifting up those who have suddenly fallen into death, and who, but a moment before, were in the full of life, is a good effort, even in imperfection of grand result; and if attended in the end with affirmative result, would be, of all efforts in the practice of our art, the grandest; so that, in practice, the enterprise towards any improvement of treatment is worthy any amount of labour. Philosophically, the study is equally worthy, for it leads us to contemplate the physical phenomena of death with an appreciation which nothing less than an experimental research, tending towards the highest of intellectual advancements and the solution of the most solemn of mysteries, can develope and sustain.

I wish us, if you please, to keep those two lines of thought in our minds as we proceed; to think first of the practical, as experiment teaches us fact; to think of what is suggested for practice by each experiment; but to think also, of the general teaching that may be gleaned of the alliances of conditions of disease and of death, of the reasons why phenomena of death are manifested, and of the methods by which the phenomena may possibly be averted or removed in various forms of disease.

Two Forms of Real or Apparent Death.—When an animal body ceases to render to any of our senses evidence of motion, voluntary or involuntary, we are accustomed in the common range of our knowledge to think it is dead. If, when we try to make the body move of itself, we fail in the effort, we usually affirm the fact of death; but if there is to be detected the *merest ripple* or motion in any part or organ, we hesitate to pronounce the *word. In a certain* rude sense we are correct in this mode of reasoning, for

death truly is inertia of all that was actual or capable of motion under the *régime* of life. But in a scientifically strict sense we are not correct, for the inert body may not be dead; it may be simply in a condition of apparent death, from which it might recover, or it may be in a condition from which, according to our present light of knowledge, it is absolutely irrecoverable.

Thus I would begin by pointing out this truth; and, as far as I know, it is the first time the same truth has been clearly defined: that when motion ceases in an animal, the body settles into one of two physical states:—(*a*) a state in which the water and crystalloidal matter are fixed, the fatty matter solid, but the colloidal matter still hydrous and ready for action; (*b*) a state in which the water and crystalloidal matter are free, but in which the active colloidal matter has become pectous—has passed, that is to say, from the hydrous to the pectous condition. I propose, therefore, to divide the process of death immediately sequential to the arrest of motion into these two conditions—

1.	2.
Crystalloidal.	Colloidal.
Glacial.	Pectous.
Solutive.	Insolutive.

As a rule, the immediate condition of the body after arrest of motion of life is the second condition named above, the pectous or insolutive; for so soon as the animal motion has ceased, the tendency of the fibrine is to become insoluble, and to settle into the solid or pectous form. Only one circumstance connected with death can, as far as I know, prevent this change, and that is, exposure to great cold. If the body, at the time of death, is so placed that it is quickly reduced below 45° Fahr. in all parts, the pectous change will be avoided, and the solutive or glacial condition will be established. As I shall illustrate presently, we can, by experiment on certain animals, induce the pure glacial death; and there are some facts which tend to prove that the same kind of death may happen even to man. But let us at once understand that the event in the human subject is extremely rare.

It is essential to have the two conditions immediately following death, of which I have spoken, in the clearest appreciation; and especially so when we turn from the study of condition to the study of treatment. For here at once is a fact of primary interest: the state which I have called glacial or solutive is one from which we may secure recovery; the pectous or insolutive is one from which there is, according to our present light, no means of recovery. Moreover, as the glacial lapses into the pectous condition very easily on mere elevation of temperature, it is worth remembering that in processes of recovery we may, if we are not careful, transform the recoverable into the irrecoverable death.

Characteristic Features of the Glacial and Pectous Conditions.—Let us now turn to the physical characters of the animal matter in and during the two conditions named. At first the animal tissues and fluids are closely alike: there is appearance of solidity, with continuation of form. Here, for example, are two eggs from which the shells have been removed; both are solid, both admit of being cut by the knife, and both, when cut, present the same general appearances of surface. But these eggs are in entirely different conditions: the one is in the state of solidification from cold, which we call "glacial;" the other is in the state of solidification from heat, which I call "pectous." The first is re-soluble without chemical decomposition of its parts; the second is insoluble unless it be allowed to decompose. Here are two specimens of blood, both solid, or rather semi-solid, looking each as if clotted; they were taken from the same animal—a sheep—two hours ago, and in colour, consistency, general character, they are still as one; but they are quite different in this physical respect—that one is in the glacial, the other in the pectous condition of solidification. I take the first, gently warm it, and it liquefies; I take the second, gently warm it, and it remains solid; in short, while the first specimen could be brought back to the con-

dition of natural fluid blood, the second is immovable. It is worth while before we move from these specimens of blood to make a further observation. In these bloods the fibrine is the colloidal substance that undergoes change. Now, fibrine at rest and out of the body passes into the pectous state whenever the fluid of which it forms a part is at or above a temperature of 45° Fahr. If, consequently, in the process of thawing blood that has been made to undergo glacial solidification, we raise the temperature too suddenly, we may transform the glacial condition into the pectous without witnessing the intermediate stage of fluidity, so rapidly will that pass over. In order, therefore, to successfully thaw frozen blood, we must put the glacial mass into a metal cup that is immersed in water above freezing-point, but not above 45° Fahr., and we must add a little more frozen blood if solution is taking place too quickly. In this manner we can get the blood fluid, and can hold it fluid for a long time by simple management of temperature. I press this point forcibly on the attention, because it explains the cause of many dangers in efforts for recovery, local or general, after glacial solidification.

We pass from the specimens of blood to something more telling. Here are two animals—two carp; both are what would be called dead; both are stiff, motionless, cold. Without experiment, I could not myself tell the condition of one from the other, were they brought before me accidentally; yet they are so far different that one of them is actually *not* dead, while the other is irrecoverably dead—the one is locked up motionless in glacial, the other is pectous death. I take the fish that is locked up in pectous death, and manipulate it as I will, but I cannot make a muscle move; I take the fish in glacial death, and, if I bring sufficient care to bear, I can unlock the fixed muscles, restore circulation, and restore life. I will try this experiment. I place a fish solidified by cold in a globe containing ice-cold water, with a little ice floating in the water, and then I pour in hot water, taking care, if I can, that the ice is not melted too quickly; and, if my arrangements are correct, the fish in a minute or two will move briskly. It does not move, and I see I have failed. I have failed for want of due care; I have raised the temperature of the water too high, and have transformed the glacial into the pectous form of death.

We need not regret this experimental failure, for it is a useful lesson, indicating how easy is the transition from one state to another. We will simply take a second carp, that has been also locked up motionless in glacial death, and try again, using more care to restore. This time we succeed; the rigid animal rapidly relaxes, and leaps even out of the water as it is resolved into life. For a time it will remain dull, but it will recover as perfectly as though nothing had happened to it.

This experiment, on one single fish, is but representative of a larger experiment sometimes seen. Not long since, Mr. King, the well-known naturalist, of Portland-road, had sent him from Newcastle a cargo of gold fish. The fish had been placed in tepid water; but, in journeying to London, water and fish too were fixed by intense cold, and when they arrived at their destination, the animals were all intensely rigid, and apparently dead. On pouring heated water upon the ice, and so dissolving it gradually, the fish recommenced to move in the water, and, as I learn from Mr. King, who himself carried out the proceeding, they all recovered. The experiments thus described can be performed on frogs in an equally determinate manner. When, however, we ascend to the higher class of animals, the process of resuscitation from glacial death is more difficult; the sources of difficulty being that the whole mass of the animal body cannot be equally and simultaneously resolved, and that in the higher animals the blood passes much more quickly into the pectous state; but what we have seen illustrates with sufficient clearness the distinction, in respect to the restoration of life, between glacial death and pectous death.

I have already said that the two conditions resemble each other closely. It is *so*. In both states the muscles may seem firm and rigid; in both the blood may *seem* solidified if a vein be laid open; in both the crystalline lens may appear

opaque; and in both all motor phenomena of life may be entirely absent. But here is the distinctive difference: In the glacial death the active colloidal structures remain hydrous and ready to react; in the pectous death they have taken on a new state—they have been rendered molecularly inactive in respect to motion of fluidity, and cannot be restored to their original condition.

I have said that the outward signs of death are much alike in both kinds of death. I should add now that the more refined evidences of death answer equally in both cases. In glacial death, while it lasts, the muscles fail to respond, unless heat be introduced, either to mechanical or electrical excitation. When we lift up a part of the body that is thin and semi-transparent there is no colouration from vascular current; nay, when we try Laborde's ingenious experiment of thrusting a needle into the muscles of the animal the steel comes out unoxidised. In a sentence: In the pure and extreme glacial death there is perfect cessation of motion, as far as we can gauge, and yet the functions are not impossibly prevented, for we know how to restore some animals by the simple process of restoring heat in a gradual and scientific way.

And still, with all the similarities, there is the marked difference that the glacial condition can, for a given time, be recovered from—and perhaps for any time can be recovered from—if evaporation be prevented; while the pectous state cannot be resolved by any known method. If the resolution of the pectous condition back to the fluid condition could be secured without change of molecular constitution, we should indeed make progress; but up to the present time we have not succeeded in the attempt. Here is this pectous or coagulated egg; here is this pectous or coagulated blood; here is this pectous or coagulated carp—the problem is, how to bring them back from the insoluble to the soluble state without changing their character and their properties; how to bring them back in the same way as we bring back the glacial egg, the glacial blood, the glacial animal. Whoever may effect this transformation is a master in science.

Some years ago I thought, in respect to blood, I had, in an imperfect manner, resolved the difficulty. I took coagulated blood, triturated the mass with ammonia until it became fluid, and then extracted the volatile alkaline solvent by exhaustion under the air-pump; and it is true that a process like the process of recoagulation could afterwards be induced. I fear I was deceived, and that the condition of solidity induced was not the true pectous condition; it was like it, but was not the same.

I must leave these definitions of the two states of animal bodies after death, in order to pursue the rarer of the two states—that in which the glacial condition remains for a longer or a shorter space of time. We have seen that in fish and in frogs the body may be brought to such a degree of cold that the process of pectous change may be suspended. It remains to be asked whether the same may occur in the higher animals, and in the highest animal in the scale of created beings on this planet—man.

Touching warm-blooded animals, I may say that, after many experiments, I have once known a recovery of a kitten after no less than two hours' immersion in ice-cold water; but I have repeated the experiment several times without obtaining the same result. Once, also, the following experimental fact occurred to me, and it is of singular interest:—A dog was put to sleep with the vapour of chloroform during a time of intense frost. The animal died in the vapour, and the body was opened after death, and was left exposed to the open air with an injecting tube tied in the ascending aorta. Three hours after exposure to the cold air, the thermometer registering six degrees of frost, water at 130° was injected by the tube through the arteries of the animal. The result was most singular: as the warm fluid traversed the body, every muscle appeared to be brought into action. The intestines first showed active vermicular action; the muscles of respiration followed; and, finally, the muscles of the body generally, commencing with the facial, took on movement. At one moment it seemed as if the animal were alive again; but as the injection was

continued the muscles settled into persistent contraction—they had passed through an interval of motion, during which they had been transformed from the glacial into the pectous state.

Observations on the Human Subject.—Observations on the human subject after death by simple cold have been very imperfect, but facts have been elicited which demonstrate that even in man the pectous change, in the muscles at least, may be suspended for long intervals of time, and that the muscular motion may be reinduced under the stimulus of heat. The great experiment of Aldini—in which a man who had been executed was made to exhibit such extreme excitability of muscle that he seemed to live again—was of this character, the man having been submitted to the executioner on a day when the air was extremely cold; and later experiments have confirmed what was seen by Aldini and his fellow-observers. In cases of death by drowning in water at freezing-point, some truths even more practical have been brought under notice. Last year, my friend, Dr. Belgrave, of Hendon, was summoned to attend two men who had been immersed in the lake at the Welsh Harp, Hendon. One of these men was extricated from the water by Dr. Belgrave himself after twelve minutes of immersion, and, artificial respiration having been immediately set up by Silvester's method, the man recommenced to breathe naturally, and lived for several hours—the death taking place, ultimately, from what Dr. Belgrave considers to have been congestive bronchitis. It was unfortunate that this patient was conveyed quickly to the house, and, before the Doctor could control the treatment (the second man being also under his supervision) was placed in a hot-water bath, a method which, as I shall show in my next lecture, is opposed in every particular to recovery.

In this case, then, there was an example of a man who was subjected to drowning and cold at freezing-point for twelve minutes, and in whom, nevertheless, the muscles remained capable of excitation and the brain of consciousness (for the man became conscious), and who, on restoration of respiration, lived again.

A case such as that described by Dr. Belgrave, and so thoroughly supported, leads to the conclusion that, in sudden death by drowning and cold, the body of a warm-blooded animal may be so left that the colloidal part shall not for a long period become pectous, but that it shall be left in a condition for recovery even after a prolonged immersion. I have been led thereupon to endeavour to ascertain, by direct observation on the inferior warm-blooded animals—first, what are the phenomena of death after the same mode of death; and, secondly, what are the obstacles to recovery. The first of these inquiries I will proceed to explain, in so far as I have obtained information; the second I will reserve for another of our meetings.

Mode of Death and Condition of the Body of Warm-blooded Animals, after Drowning and Cold.—When strong and healthy warm-blooded animals fall in water at freezing-point, the death from drowning, if death follow, is, as a rule, remarkably rapid, and apparently free from pain. The same obtains in the human subject; for, in the case of a woman who was immersed in water at freezing-point, who was taken out in an unconscious state, and who remained unconscious for more than twelve hours, I had the opportunity of putting to her the question of her sensations at the time of the accident. She affirmed to me that she felt nothing but an indescribable intenseness of cold, which seemed to make her body feel smaller, followed as quickly by an utter and helpless exhaustion, after which she remembered nothing. It was proved by those who were engaged in dragging her out of the water, that she struggled severely, and was convulsed; but of this she had no knowledge whatever. In strong animals we sometimes see convulsive movements when the body is under the water, and these may occur a few seconds after what appears to be the quiescence of death. The whole of the phenomena, up to the time of absolute cessation of motion and of consciousness, are included in the period of a minute, probably, in every case, and I have seen them included in thirty-five seconds. In very young animals the struggle for life is longer than in old, and in animals well primed with food, and well fed, the

struggle is longer than in animals requiring food or imperfectly nourished; but in all it is very short. I refer to these facts, because to those who have been so unhappy as to lose relatives or friends by drowning and cold, it is a satisfaction, sad as it may be, to know that the death is free from prolonged suspense and from acute pain. Indeed, I should judge it to be one of the easiest of deaths—as easy as death by chloroform. The convulsive movements that are seen are unconscious movements; they are the same as those which mark the period of stupor, in death by hanging, by narcotic vapours, by concussion; and they are simply the results of action of muscles from which the controlling power of the nervous centres has been removed.

Various speculations have been offered respecting the suddenness with which those who are immersed in water at freezing-point sink in it so readily, the favourite being that the sufferers are subjected to what is commonly called cramp of the extremities, and are thus prevented from exerting themselves, even if they be swimmers, so as to escape from death. My own view differs from this. It is clear, I think, to all who have witnessed the phenomena of death by drowning and cold, that the cause of the sudden and complete collapse is peripheral nervous shock and sudden exhaustion of the nervous centres by direct extraction of animal heat. It would be most correct to say that the death is caused by nervous syncope; for although there is no actual loss of blood from the vessels, there is loss of the force the blood supplies, which amounts practically to the same thing.

If the body be removed from the water in from one to two minutes after complete immersion, the muscles everywhere are found perfectly flaccid; and assuming the convulsion which always precedes death shall have been passed through, the muscles will be found motionless as well as relaxed. The voluntary muscles will be found at first very feebly excitable; the respiratory muscles more excitable; the heart not simply excitable under stimuli, but acting of itself, often in perfect rhythm and in all its parts. Thus, the heart in these cases, as in cases of hanging, poisoning by narcotic vapours, and hemorrhage, continues to the last true to its duty. The action of the heart is, however, very feeble, and it is not sustained long as an independent motion. I should limit the duration of action to five or six minutes.

The heart and all the other muscles, motionless and flaccid though they are, are nevertheless capable of showing vigorous action when they are supplied with heat; and under the influence of heat they soon undergo true rigor mortis. If a dead animal just removed from water at freezing-point be laid on one of its sides upon warm sand, at 115° Fahr., the whole of the muscles on that side will pass into firm, pectous rigidity, while the muscles on the side exposed to the air will remain flaccid. We may thus witness the curious phenomenon of intense rigor mortis and flaccidity in the same animal at the same time.

The condition of the internal organs of the body immediately after death by drowning in water at freezing-point is favourable to recovery, as you will see here in the body of an animal—a rabbit—that was removed from the water five minutes after the cessation of respiration. The conditions are fairly representative of what is always seen after this form of death. The brain and spinal cord are free of congestion, the cut surfaces free of vascular line or speck, the structure rather firm; the sinuses hold blood, but are not distended. The heart is charged with blood on the right side, but not to distension; the pulmonary artery contains blood in its trunk and branches; the left side of the heart is contracted, but contains a little blood both in the auricle and ventricle; the arteries are empty, indicating that the final arrest of the circulation of the blood was in the pulmonary tract of blood. The abdominal organs are natural, neither congested with blood nor pale. The muscles are still flaccid, and, under the influence of heat, are capable of undergoing contraction.

We should infer, from what we see here, that for some time after death, a body so little injured and so ready for motion ought easily to be set again

in motion. It does truly often occur to my mind as if the merest device would be sufficient to bring back the phenomena of life. What is more, if the body already drowned be left in the water at freezing-point, it will retain the favourable conditions I have described, not for minutes merely, but for hours—as long, probably, as the carp which we brought back to life at the early part of the lecture. I am certain, too, that the day must come when this suggested restoration of the higher animal will be matter of fact, miracle as it now may seem.

Against such success at this moment there are certain obstacles which observation has rendered clear to view, and there may be obstacles not yet foreseen; but those known are sufficient to engage our attention, and they are fatal unless they can be removed or overcome.—*Medical Times and Gazette, Feb.* 18, 1871, *p.* 181.

106.—POISONING BY STRYCHNIA SUCCESSFULLY TREATED BY BROMIDE OF POTASSIUM, WITH SOME REMARKS ON THE THERAPEUTICAL PROPERTIES OF THE BROMIDES.

By Dr. Charles B. Gillespie, of Freeport, Pa., U.S.

[The patient had taken three grains of strychnia two hours before being seen by Dr. Gillespie.]

His pulse was 70, hard and contracted; respiration good. The whole surface of the body was quite cold; great anxiety in the expression of the face; sight and hearing perfectly normal. On giving him drinks, the great difficulty was in getting the cup to his mouth without throwing him into convulsions; but when once there, he would gulp the contents down spasmodically in great mouthfuls. He had but little control over his arms; as soon as he let go his grasp on the bedstead they would jerk violently, and continue thus until he laid hold of something solid and immovable.

The spasms were evidently becoming more violent and frequent, and beginning to implicate the muscles of respiration. Not having the remedy I desired with me, I gave him a teaspoonful of the fluid extract of hyoscyamus, and then hurrying home, weighed out one ounce of bromide of potassium, which I dissolved in three ounces of water. Of this solution I ordered one-half ounce every thirty minutes; and I felt so confident of its efficacy in this case that I intrusted the administration of the remedy to a carefully instructed attendant, and did not revisit the patient till next morning, when I found him out of danger. The paroxysms had gradually become less violent and frequent, and by the time the last dose of bromide was taken at midnight, he was able to get up without assistance and walk to his own room. The only bad effects remaining were excessive muscular and nervous prostration, with an occasional slight convulsive shudder, which, however, entirely passed off through the day, and in thirty-six hours' time he was up and at his usual business.

I am confident, that but for the prompt administration of large doses of the bromide my patient would not have survived. How much the large doses of hyoscyamus had to do with the result I am not prepared to say; it produced a free and painless catharsis, and may have aided in relaxing the spasms. But to the well-known effect of the salt over the anterior or motor portion of the spinal cord, the good result in this case is especially to be attributed. The physiological effects of the strychnia and bromide of potassium are, I am sure, directly antagonistic. In this case, the patient had taken fully two grains and a half of pure strychnia, for I obtained the paper in which the strychnia was wrapped, and found that all of it was taken save about one-half grain that adhered to the paper, and which I afterwards weighed. This certainly was sufficient to destroy life in any human being.

I may here be pardoned for saying something about my use of the *bromides* in the practice of my profession. The first manufacturers of *bromine* and its compounds, in this country, were Drs. David Alter and E.

Gillespie, of Freeport, Armstrong Co., Pa. This was more than twenty-five years ago; and it is to them I owe my first knowledge of the bromides and their use in medicine. For more than eighteen years I have used the bromide of iron and the bromide of potassium almost constantly in my practice. The bromide of iron especially is a great favourite, using it almost entirely to the exclusion of iodine in its outward application as a resolvent. Internally, it has proven, in my hands, to be one of the best chalybeates in use. In chlorosis and all female irregularities, there can be nothing better. And in chronic diarrhœa, in urethral or vaginal discharges, it is a most valuable remedy. In many years of practice, I have never yet known it to fail in curing erysipelas, whether traumatic or idiopathic. My method of treating erysipelas is to freely paint the affected surface with the solution two or three times a day, at the same time giving the remedy internally. In diphtheria and croup, it has been my chief dependence. In the anginose and malignant forms of scarlatina I have tried it effectually, but without much apparent benefit. In senile catarrh and chronic bronchitis, where there is much expectoration and cough dependent upon its exudation into the air passages, it is a first class remedy, taken into the stomach and used occasionally by inhalation.

My experience with the bromide of iron proves its great value. It is always reliable and safe, and in the form in which I use it, is quite palatable and easy of assimilation. My formula for preparing the bromide is the following:—

Take of bromine 1 pound, of water 4 pints, small iron nails 3 ounces and 2 drachms. Pour the water into a one gallon glass bottle, and then add the bromine, and lastly the nails. Keep the bottle in a moderately warm place until reaction ceases; the union of the bromine with the iron will develop a great amount of heat, for which reason the glass ought to be well annealed. After the heat has passed off, decant the solution from whatever impurities may be in the iron, and keep in well-stoppered bottles. The dose of this solution is ten drops or less, three times a day, and may be given in sweetened water, or, what is better, in simple syrup. For external use, the solution should be painted on with a feather or small brush. For children, or as an application to parts of the body, where the skin is thin and sensitive, the solution should be diluted with water. Sometimes, when applied undiluted to the thighs or inner arm, it causes a great deal of pain, which, however, may be easily removed by the free application of the spirits of turpentine.

I have had many years' experience with the bromide of potassium, and have used it in a variety of diseases. In rheumatism, it has at times been of signal service; in various forms of spasmodic complaints I had found it extremely beneficial, without, however, being at the time aware of its true physiological power over the spinal cord.—*American Journal of Medical Sciences, Oct.* 2, 1870, *p.* 420.

107.—MODE OF ADMINISTERING CHLOROFORM.

[The following is the mode of administering chloroform at St. Bartholomew's Hospital, by Mr. Bloxam, Chloroformist to the Hospital.]

The bottle is graduated so as to show the number of minims withdrawn, whilst the stopper is perforated and drawn out to a fine point. A few shakes of the bottle, pour out a little of the liquid on to a bit of lint laid lightly over the patient's face, and every now and again the lint is reversed as more chloroform is poured out, Mr. Bloxam introduced this mode of administration, and has been well satisfied with its results in some 2000 cases in which he has already employed it. Where a Clover's apparatus cannot be had, this method of Mr. Bloxam's seems likely to prove a very convenient substitute.—*Med. Times and Gazette, Feb.* 4, 1871, *p.* 126.

108.—OIL OF PEPPERMINT AS A LOCAL ANÆSTHETIC.

By Dr. Alfred Wright, Finchley.

A few years ago, when in China, I became acquainted with the fact of the natives, when suffering with facial neuralgia, using oil of peppermint, which they lightly apply to the seat of pain with a camel-hair pencil. Since then, in my own practice, I in the same way frequently employ oil of peppermint as a local anæsthetic, not only in neuralgia, but also in gout, with remarkably good results; indeed, the relief from pain I have found to be almost instantaneous."—*Lancet*, Nov. 19, 1870, *p.* 726.

109.—CLINICAL RECORDS OF ANTISEPTIC DRESSING BY CARBOLIC ACID.

A considerable interval has elapsed since we last made any special record of the treatment of wounds by carbolic acid in the London hospitals. At that time this agent was very generally applied in some form or other, and under various conditions; and the practice of those hospitals in which the experiment was made with earnestness sufficient to afford reliable data appeared to encourage a persistence in the careful and studious application of the system. It appears, however, that in many of the hospitals this subject has not survived that first glow of interest which a new thing rarely fails to kindle; and it would be interesting to know how far this result has been due to the fact of experimenters not perceiving that the application of the antiseptic system, as Prof. Lister applies it, requires not only the mastery of a theory, but the practice of an art and an exercise of judgment which it is not possible to acquire casually in the course of one or two trials.

In endeavouring once more to direct attention to this system of dressing, it is not our object to pronounce a judgment on its merits, but, believing that carbolic acid is a powerful agent both for good and evil (as the following testimony sufficiently proves), rather to elicit what are the conditions which determine success in some cases, and failure or the production of positive harm in others. If we succeed in doing this, we think we shall contribute to an advance in the general knowledge of the subject.

St. George's Hospital.—At this hospital, Mr. Holmes, after carefully observing its application by Prof. Lister, has given the carbolic antiseptic treatment a long and careful trial, which has been followed by such marked results as to raise it high in the esteem and confidence of the hospital staff. It has been found that the proportion of wounds that heal by first intention is decidedly greater than where no antiseptic is employed; in others, in which it has occurred, suppuration has been much less than might have been expected. It is a valuable safeguard against putrefaction, and it confers a remarkable immunity from surgical fever, and the other deviations from health which are apt to complicate the healing of wounds. Mr. Holmes's most marked successes have been in the treatment of abscesses, and in the conversion of compound into simple fractures.

Middlesex Hospital.—Mr. Hulke has applied the carbolic treatment to a variety of cases, with very good results; but he is not prepared to assert that it has any advantage over chloride of zinc, either as to the production of immediate union or in the maintenance of a healthy condition of discharges. He believes carbolic acid lotion (strength of two grains to the ounce) to be a very serviceable injection in chronic cystitis; the acid is not, he says, absorbed from the surface of the bladder, and in no case where it has been thus applied has he observed the train of symptoms and condition of urine which are said to be associated with its use.

London Hospital.—Mr. Couper has been kind enough to furnish us with *the main* results of the extensive trial which carbolic-acid dressing has received at his hands. Since September, 1869, he has used Lister's antiseptic

dressing in about fifty important cases. The majority of them were conspicuous for the small amount of constitutional disturbance produced by very severe injuries. The patients after a few days were free from pain, they ate and slept well, and had an appearance of health by no means usual after extensive wounds. Measured by the thermometer, the wound-fever was of short duration, and was occasionally absent altogether.

In some instances, the urine was black for one or more days after the first dressing, but in no case was the carbolic acid absorbed into the blood in such quantity as to cause symptoms of poisoning. Mr. Couper does not now regard the discoloration of the urine as of any moment.

The immunity from erysipelas and pyæmia was most marked. There did not occur one instance of pyæmia. One case only was attacked with erysipelas—a case of scalp wound, in which there was present an abrasion of the ear, which was not protected by any dressing; the swelling and tenderness distinctly spread from the face and neck to the scalp.

One patient took erysipelas nine days after the antiseptic dressing had been abandoned. He had recovered from an extensive compound fracture of the skull, in which the trephine had been used. Only one patch of skin granulations, less than half an inch broad, remained unhealed, when the carbolic dressing was laid aside in the belief that it had become too stimulant and prevented the granulations from drying up.

To apply the dressing successfully, it is, Mr. Couper believes, necessary to remember that carbolic acid is a stimulant as well as an antiseptic. If kept sufficiently long in contact with an *open* wound, so far from preventing the formation of pus, it stimulates granulations and increases and prolongs suppuration.

The aim should be to secure the antiseptic action without any stimulation of the wound. Generally this is best attained by stitching the skin edges accurately together with fine carbolised silk. By this means the skin itself is made to shield the deeper portions of the wound from stimulation.

The experiment of dressing two similar wounds of the calf—for which no stitches were used,—the one with strips of wet lint, and the other with Lister's dressing, showed the process of filling up by granulation to be materially slower under carbolic dressing thus used (or misused) than under wet lint.

Mr. Couper's experience further tends to show that an antiseptic state of the fluids within a wound is but one of many conditions necessary for union without pus. Complete apposition of the surfaces, and the absence of all gliding of one surface on the other, are at least as essential. Unless these conditions be secured the antiseptic is powerless to prevent suppuration. For this reason deep sutures often contribute to complete success. Carbolised catgut is the most suitable material for this purpose.

Seven out of eight successive cases of compound fractures of long bones were converted into simple fractures, either with or without a small patch of surface granulations, which dried up slowly. There was no pus given out, except from the surface granulations, and its amount was insignificant. The eighth case made an excellent recovery after exfoliation of a portion ot the tibia. Suppuration was delayed for nearly three weeks, and the wound continued antiseptic after its occurrence.

Two compound fractures of the skull healed without any suppuration. In one there was depression, and the trephine was used. In the other the outer table only was ascertained to be somewhat deeply indented.

Several deep-seated collections of pus were emptied antiseptically, with most satisfactory results. One man made an excellent recovery after a severe illness caused by an abscess in the left kidney. An equally good result followed in two instances of large abdominal abscess, caused by pelvic cellulitis after parturition.—*Lancet, Jan.* 14, 1871, *p.* 47.

110.—GLYCEROLE OF STARCH.

This preparation is made by rubbing well together one part of starch in eight of glycerine; then heat the mixture gradually to 240° Fahr., constantly stirring until a translucent jelly is formed. The glycerole of starch is a capital substitute for lard in making ointment. Moreover, this preparation of starch seldom becomes spoiled, and keeps for a very long time. As a local remedy in many acute affections of the skin, and to prevent the pitting of small-pox, it deserves a more extensive trial.—*Journal of Cutaneous Med., Dec.* 1870, *p.* 235.

111.—SOLUTION OF SANTONINE.

By Dr. JOHN HARLEY.

The insolubility of this vermifuge impairs its utility. Cold or warm water takes up the merest trace. Chloroform, absolute alcohol, the strongest acetic acid, turpentine, hot olive oil, and hot glycerine are the only simple fluids that dissolve any appreciable quantity. On cooling, it separates from the oil and glycerine; and the addition of water to the other solvents produces the same result.

It is obvious, therefore, that none of these solvents are adapted for the use of santonine as a medicinal agent. A wish to determine the effect of santonine in parasitic disease of the bladder led me, after a good deal of trouble, to find that I could form a suitable stronger solution than was needed for my purpose by means of carbonate of soda.

I may formularize my results thus:—

℞. Santonini, in pulvere, gr. xij.; sodæ bicarbonatis, gr. xx.; aquæ destillatæ ʒ iij.

Put the soda and water into a flask, keep the fluid near the boiling-point, adding, as it disappears, about two grains of the santonine at a time, until the whole is dissolved. Solution is effected in about half an hour, during which time the water is reduced to ʒ ij. If need be, reduce by boiling to this bulk, when ʒ j will contain a full dose—six grains of santonine. If an alkaline reaction be objectionable, neutralize with acetic acid.

Characters of the Solution.—Bright and permanent, strongly alkaline, free from odour, and, excepting that of carbonate of soda, of taste. Carefully neutralized with acetic acid, an equally bright and permanent neutral solution is formed. Both the alkaline and neutral solution may be diluted to any extent with either cold or hot water, without impairing the perfection of the solution of the santonine. Excess of acetic acid, after some hours, and the mineral acids immediately precipitate the whole, or nearly the whole of the santonine, unchanged and in its original form of colourless, rectangular plates with bevelled edges.

Use.—By the process above described we obtain a bland *alkaline solution*, so completely void of irritating qualities that it may be dropped into the eye without causing the least sensation; and a *neutral solution*, for use in those cases in which an alkali would be unsuitable.

Mixed with from one to twenty times its bulk of acid urine, sp. gr. 1017·5, and containing excess of uric acid, and retained at 100° Fahr. for several hours, not the faintest turbidity is produced, unless in the case of the alkaline solution, and an excess of phosphates in the urine, when a faint cloudiness may occur from the separation of the latter.

This proves that excess of acid urine (uric acid) fails to cause a deposition of santonine.

As an injection, from ʒ ss to ʒ j (three to six grains) of either solution may be mixed with three or four ounces of warm water and passed into the bladder or rectum.

I have already shown that absorption is readily effected by the mucous *nbrane of the* bladder; and therefore general as well as topical effects *be expected* when santonine is introduced by this channel.

In cases where powders are objected to, a pleasant mixture may be made by adding a little syrup and flavouring water to the santonine solution.—*Practitioner, Feb.* 1871, *p.* 85.

112.—CALVERT'S CARBOLIC PRODUCTS.

We have recently investigated two new varieties of Carbolic Products which Dr. Grace Calvert, F.R.S., of Manchester, has introduced, with much advantage to sanitary and medical science—Carbolised Tow and Carbolic Soap. The carbolised tow we can recommend in decided and unqualified terms to the use of surgeons. It is a fine, long-fibred, soft, and clean tow, impregnated with definite quantities of carbolic acid. It has many advantages. Soft as a dressing, antiseptic, and deodorising, it may with advantage be used for most of the surgical purposes to which lint and sponges and cotton-wool are now applied. In hospital and dispensary wards, it, or something of the kind, will presently, we are persuaded, be indispensable; and we recommend its trial.

The Carbolic Acid Soaps are almost sufficiently described by their title. The medicinal soap contains strictly 20 per cent of the agent, and has been warmly recommended by eminent dermatologists for use in many forms of skin-disease, in addition to its obvious sanitary uses. The carbolic toilet soap contains 5 per cent of carbolic acid, and any carbolic odour is here masked by a perfume. We use it always after handling wounds or the bodies of patients, and after operations. It will commend itself to the use of medical men in their consulting-rooms, to accoucheurs, and for use in the lying-in room. A carbolic shaving and tooth soap deserves attention as being a tooth-soap of which the use is refreshing, and which absolutely purifies the teeth and mouth, and tends effectually to the preservation of the teeth by the destruction of the organic matter which collects around their bases and in the dental interspaces. In shaving-soap, we think the presence of carbolic acid not advantageous or useful. It is not sufficiently known that a very minute dilution of Calvert's exquisitely pure "gold-label carbolic" makes a mouth-wash which is highly refreshing, which is flavourless, which removes all odour (as of tobacco-smoke) from the breath, and which may be perfumed at pleasure.—*British Med. Journal, Nov.* 26, 1870, *p.* 582.

113.—THE DOSES AND PREPARATIONS OF CARBOLIC ACID.

Report of British Pharmaceutical Conference, in the London *Pharmaceutical Journal.*

As a rule, it is better to dissolve the crystallized carbolic acid (Calvert's) in the proportions of one part by weight of the acid to six of glycerine (*carbolate of glycerine*). In this state it can be equally diluted to any degree of strength.

In general a *dose* of carbolic acid is one grain in an ounce of water.

As a *gargle*, one or two grains to an ounce of water.

As an *injection*, one grain to four ounces of water.

As a *lotion*, fifteen grains to an ounce of water.

As an *ointment*, sixteen grains to an ounce of benzoated lard.

As a *liniment*, one part to twenty of olive-oil.

As a *plaster*, one part of carbolic acid to three parts of shellac.

The crystallized carbolic acid is to be used as a caustic.

The carbolate of glycerine, as above, use in one or two drop doses internally.

Antiseptic oil for abscesses, one part of acid to four of boiled linseed-oil.

Antiseptic putty, six spoonfuls of the antiseptic oil mixed with whiting.

Aqueous solution of carbolic acid is one part of acid to forty of water (*one ounce of acid to* a quart of hot water well agitated and filtered).

Sick-rooms, to disinfect: place a portion of the dissolved crystals in a porcelain dish, and float it in a larger vessel of hot water.

Disinfecting purposes generally: one pound of *crystals* to six gallons of water. *Fluid*, one part to eighty of water. *Powder*, one ounce of crystals with four pounds of slaked lime.

For drains: one pound of the fluid carbolic acid to five gallons of warm water.

Toothache is often cured with one drop of carbolate of glycerine; and diarrhœa arrested in half an hour with two drops in a wine-glass of water.

In all cases of parasitic life it is advisable to commence with very dilute carbolate of glycerine.

Inasmuch as carbolic acid will destroy the power of *vaccine virus*, it becomes an interesting inquiry as to the possibility of using carbolic acid internally as a preventive, so as to fortify the human system against the incoming of zymotic diseases.

I have some striking facts in support of this probability, but my observation has been too limited to do more than incline to the belief; and here I leave it in the hands of the Conference, expressing my readiness to give further details if the members desire it.—*Edinburgh Med. Journal, Dec.* 1870, *p.* 563.

114.—KALI-KUTKI: A NEW TONIC.

Mr. M. C. Cooke, in a late number of the Pharmaceutical Journal, gives a description and an account of the properties of this plant, which has long been considered to be the black hellebore, but which really belongs, not to the Ranunculaceæ, but to the Scrophulariaceæ. Though unknown in the English market, it is well known throughout India. The drug consists partly of the root and partly of the stem of the plant. The root part is very light and brittle, about the size of a goose-quill, brownish-white in colour externally, and deep black internally, with short waxy fracture. It is stated to be a very valuable tonic, Assistant-surgeon Moordeen Sheriff considering it equal to gention and calumba, and superior to chirayta. As a dose, ten or twenty grains as a tonic, and from twenty to forty as an antiperiodic, are recommended.—*Lancet, Feb.* 4, 1871, *p.* 169.

115.—CLEARING OF MUDDY WATER.

Dr. C. Schlœsing states, in an article in the Comptes Rendus, that waters contaminated by floating particles of clay may be readily clarified by small quantities of salts of lime. It is well known that the waters of rivers, after a heavy fall of rain or snow, and sometimes throughout the winter, do not become quite clean by deposition, even if left undisturbed in large reservoirs for a long space of time. The author recommends the addition of 1-1000th part of chloride of calcium for one part of water (or seventy grains to the gallon), a quantity which effects clarification in a moment. The precipitated substance can be readily separated by filtration. Other salts of lime, such as the nitrate and bicarbonate, and caustic lime, effect the same object.—*Medical Press and Circular, Nov.* 30, 1870, *p.* 453.

116.—A PLEASANT REMEDY FOR SEA-SICKNESS.

There have been many suggestions made as to the prevention of sea-sickness, none of which have, to say the least, been found in practice to be *completely* successful. The introduction into practice of hydrate of *ral*, which produces with certainty sleep for a definite number of hours,

has suggested a means of escaping the horrors of a short sea-passage at least, and possibly of mitigating the most prolonged horrors of sea-sickness. To go asleep at Dover, and to wake to find oneself at Calais, is a plan which, failing other expedients, has in it much promise. An ordinary dose of hydrate of chloral produces sleep usually in a quarter of an hour, and with almost unfailing certainty. Some cases just published by Dr. Doring, of Vienna, seem to show that the value of hydrate of chloral to obviate sea-sickness is very great. It produces quiet and prolonged sleep. In all the instances recorded, it seems to have been of great value even during prolonged sea-voyages, giving a good night's rest, arresting violent sickness when it had set in, and stopping the tendency to its recurrence.—*British Med. Journal, Dec.* 3, 1870, *p.* 608.

117.—ON A RAPID AND ACCURATE METHOD OF MILK ANALYSIS; WITH SPECIAL REFERENCE TO THE EXAMINATION OF WOMAN'S MILK.

By JOHN MUTER, Ph.D., Director of the South London School of Chemistry and Pharmacy.

In entering upon this subject, it will not require any preliminary verbiage to show the necessity of keeping a watch on the composition of the nursing mother's milk. It has been often a matter of wonder to me that medical men did not avail themselves more frequently of the facilities offered by an analysis of the nurse's milk as an aid to the diagnosis of obscure cases of infantile disease, such as persistent diarrhœa, or continual loss of flesh without any visible cause. In such cases I have heard medical practitioners state their conviction that the milk was wrong; but when I asked them in what direction the fault existed, they were at a loss for a reply, and when I suggested an analysis they seemed inclined to think little of it, as they had never before dreamt of employing such an aid to diagnosis. On going more deeply into the subject, I found that several great impediments existed to the general employment of analysis, such as the quantity required, and the tedious and not over-accurate process of milk-examination still in use. It was therefore clear that, to render chemistry a useful aid to medical science in this matter, we ought to have a process which would combine smallness of sample, rapidity, and fair accuracy.

After many trials in various directions, it was determined to base the analysis on the real dietetic value of the milk, as represented by a determination of its solid residue, and the estimation of its nitrogenous and carbonaceous constituents. Experience derived from the use of Dr. Frankland's elegant system of water analysis by combustion *in vacuo* led ultimately to the application of a similar principle to milk. The process, when used for cow's milk, requires several modifications, in view of possible admixture with certain extraneous matters; but as it is only with woman's milk that I have to do in the present paper, these additional precautions need not now be mentioned.

The process is conducted as follows:—A small paper filter is prepared which will contain 10 grammes of oxide of copper. It is filled with the oxide and placed in a small funnel. The whole is then exposed for an hour in an air bath, so constructed as to draw a continuous current of air at 105° C. through and around the funnel. The funnel and its contents are then cooled in the desiccator, and weighed with great care, and the weight having been noted, *five drops* of the milk are cautiously let fall on the centre of the oxide, taking care that no milk spreads to the filter paper. The whole arrangement is then weighed, and the quantity of milk used found by difference. The funnel and contents are then replaced in the air bath, and exposed to a temperature gradually increasing from 50° to 105° during several hours. When the milk has been thus dried it is again weighed at intervals until it ceases to lose weight. This loss of course shows the percentage of water, and, consequently, of the total solids. The con-

tents of the filter are now transferred to a warm glass mortar, mixed with more oxide of copper, and introduced into a combustion tube. The tube is charged in the usual way, but the front part is filled through three and a half inches of its length with a roll of copper gauze previously ignited in hydrogen. The end of the combustion tube is then drawn out before the blow-pipe, and connected by an india-rubber and glycerine joint to the Sprengel air-pump. Heat is now applied to the front part of the tube, and, the air having been fully exhausted, the combustion is proceeded with, and the residual gases received into a tube over mercury. At the close of the combustion the gases are entirely transferred from the combustion to the receiving tube by the aid of the pump, and it only now remains to measure them in a manometric apparatus. For this purpose I employ the apparatus described by Mr. M'Leod in the Journal of the Chemical Society, and I find it to work most satisfactorily. The gases are first measured as a whole, and then separately absorbed by the usual reagents and measured after each absorption. We thus obtain the total volumes of carbon dioxide and nitrogen, evolved by the milk-residue, and by a simple set of calculations we are enabled to deduce the actual weight of carbon and nitrogen contained in it, and consequently its exact value in nutriment. In one continued series of operations we therefore ascertain (1) the total solids, and (2) the amount of their flesh-forming and heat-producing constituents. When thus complete, the analysis would be expressed as follows:—

Example I.

Milk from E. S., one month after confinement; child healthy.
Amount of milk taken, 0·24 grammes.
Total solids, 0·0264—11·00 per cent.
Organic nitrogen .. .. ·0014—0·5833 per cent.
„ carbon .. .. ·0167—6·5420 „
Therefore—

Water	89·00
Flesh-formers (casein)	3·71
Heat producers (fat and sugar)	7·29
	100·00

This is a good specimen of well-balanced, healthy milk.

Example II.

A. B., time after confinement not mentioned; child ailing; diarrhœa.

Water	87·69
Flesh-formers (casein)	0·91
Heat-producers (fat, &c.)	11·40
	100·00

A milk so poor in nitrogen as to be worthless for the due nourishment of the infant, while there is immense excess of sugar and fat.

Having thus laid this plan of analysis before the profession, it is for them to consider the clinical value of such examinations. It is not for me, as a chemist, to point out this further than to ask whether, by proper investigation into the properties of its mother's milk, the sick child might not often be saved by applying to her the remedies and, above all, the course of diet shadowed out by such analysis, or by at once altering the mode of feeding the infant altogether? There can never be any difficulty in procuring ten drops of the milk as a sample, and the whole analysis can be usually done in one day. Should these preliminary remarks attract the attention of any gentleman who has cases suitable for the process, I shall be glad to join him in extending the field of inquiry.—*Lancet*, *Feb.* 11, 1871, *p.* 189.

118.—HOW TO APPLY LEECHES WITH LEAST TROUBLE AND ANNOYANCE, AND GREATEST EFFICIENCY.

By L. R. (a Correspondent of the *Lancet.*)

Having had occasion to order a mustard-poultice for a patient, it became requisite to put some leeches on the same place. I was told that they fastened instantly, filled rapidly, and that the blood streamed afterwards into bread-poultices as if it would never stop. I took the hint; and now, whenever I order leeches, I always have a mustard-poultice applied first, then the leeches (two or three instead of half a dozen), and then bread-poultices. There is less trouble for those who have to apply the leeches, far less annoyance, weariness, and exhaustion for the patient, and a much more satisfactory result. The flow of blood is, however, sometimes so much greater than would be thought likely or possible, that I think it right to add a few words of caution. A few days ago one of my patients, a young lady, grown up, and of average strength, bled to fainting from only two leeches applied in this way.—*Lancet, Dec.* 10, 1870, *p.* 840.

119.—GLYCERINE INHALATIONS IN CROUP.

The Wiener Medizin Wochenschr, for November 19th, 1870, gives an analysis of a pamphlet by Dr. G. Stehberger, of Mannheim, who recommends the treatment of croup by inhalation of pure glycerine through Siegle's apparatus. He was led to try this remedy in croup from observing its good effects in cases of hoarseness and loss of voice. In 1869, after an epidemic of measles, there were numerous cases, in the practice both of Dr. Stehberger and of other practitioners in Mannheim, where, whether the symptoms were those of true or of false croup, the good results of the inhalation soon became evident. The cough became more free and moist, and the children were able to sleep almost immediately after being relieved by the inhalation. In severe and advanced cases, however, these results were not so evident; and it is doubtful whether they occur, if the remedy be not applied early and repeated sufficiently often. The glycerine is used unmixed, if it be pure; if not pure, it is diluted with a little water. The inhalations are repeated, according to the urgency of the case, at intervals varying from half an hour to an hour and a half, for about fifteen minutes at a time. Dr. Stehberger ascribes the effects of the glycerine to the fact, pointed out by Dr. M. Sims, that it increases the secretion of the mucous membranes, and thus reduces tumefaction.—*British Med. Journal, Jan.* 14, 1871, *p.* 39.

120.—ODONTALGIA.

Dr. H. T. Reynolds writes to the Phil. Medical News as follows: "For eighteen months I have been using acetate of lead for toothache. I find it to act better than any of the numerous remedies proposed in the books, and in cases in which it is applicable the relief is instantaneous. Let the patient apply one or two grains to the cavity and then spit it out. It fails in fewer cases than any remedy I have tried."—*Medical Record, Dec.* 15, 1870, *p.* 467.

121.—A SUGGESTION FOR THE PREVENTION OF INFECTION.

By James Startin, Esq., Senior Surgeon to the Hospital for Diseases of the Skin, Blackfriars.

The rapid increase and extension of small-pox, scarlet fever, and other infectious diseases at the present time, not only in those localities which

may be designated their habitual haunts, but also within the wards of general hospitals, and through the agency of public vehicles, laundries, &c., induces me to offer a suggestion, which, during twenty-five years, I have been in the habit of recommending for arresting contagion in diseases of the skin. According to my knowledge, the proposition has not hitherto been employed against fevers and other sources of infection or contagion, although I am aware that it has been used in the arts for sweetening, deodorising, or disinfecting wine-casks, dairy utensils, &c. The suggestion consists in the simple expedient of fumigating beds, clothing, closets, carriages, &c., with sulphurous acid gas, according to the following "ready method." In the case of disinfecting beds and bedding, five to fifteen minutes before the patient enters the bed, or during his removal whilst it is made, a copper warming-pan, containing a few live embers, on which a teaspoonful or two of flowers of sulphur have been thrown, is to be introduced between the sheets, and passed to and fro until the combustion of the sulphur is completed, when the pan is to be withdrawn; and after the lapse of a few minutes, the patient may enter the bed, when, should the fumes still prove too stimulating for his respiratory organs, these vapours may be intercepted by holding a loosely folded damp handkerchief before the nose and mouth until they have subsided. In localities where a copper warming-pan is not procurable, a common wicker hand-basket, or a small hamper, containing an old iron saucepan or flower-pot, or basin, in which a few hot cinders have been placed, may be substituted. This, like the warming-pan, must be put beneath the bedclothes, and moved about during the ignition of the sulphur, until the sulphurous acid gas has sufficiently permeated the linen, &c., to be disinfected.

It will be perceived that this latter plan of using the sulphur may be adapted to fumigating closets, carriages, passages, and, indeed, to the vacated chambers of the sick; the only precautions to be borne in mind being to take care that the quantity of sulphur or heat of the live embers be not too considerable, and that the wickerwork is of sufficient height and capacity to prevent the articles fumigated from being burnt in the operation.

With regard to disinfecting the clothing, articles of dress, &c., these should be lightly sponged over or sprinkled with water containing a little *well mingled* milk of sulphur, in the proportion of a teaspoonful of sulphur to each pint of water. The articles should be then ironed by means of a flat iron heated to a sufficient temperature to volatilise the sulphur, but not to burn the clothing. Of course repetitions of this process will be required, according to the extent and duration of the infection.

The daily journals have lately contained an account of a cabman who was fined £3, the cost of disinfecting his cab, after the carriage of a small-pox patient. By the means suggested, of sponging the cab-lining with the sulphur and water, and afterwards using the hot flat iron, and perhaps adding the basket-fumigation, about as many pence would be the cost of the disinfection.

It has been urged as an objection to the above procedure, that it might prove injurious to health, from the noxious vapours of carbonic oxide given out. I need scarcely observe that this objection falls to the ground if the directions given be faithfully carried out; as, if the live embers be properly incandescent, and not smoky, the sulphurous acid gas only will be produced.—*British Med. Journal, Jan.* 21, 1871, *p.* 60.

122.—ON DR. VIVODTSEF'S METHOD OF EMBALMING THE DEAD.

By Dr. GEORGE L. CARRICK, Physician to the British Embassy, at St. Petersburg.

[Embalming the dead, so largely resorted to by the ancient Egyptians as a *sanitary* measure, is now so rarely practised that the majority of medical *men have* never witnessed the process, nor observed its results. The diffi-

culty and tediousness of the operation, and its frequent failure in many instances, necessarily rendered it a very expensive one, so that it has only been called for in very exceptional cases. An easy, quick, and cheap method of embalming has been long sought for, but until Dr. Vivodtsef's invention the chief difficulties remained unsurmounted. Dr. Vivodtsef's process is so simple, short, and easy of accomplishment, and requires so little skill, that any person possessed of the slightest knowledge of practical anatomy can execute it as easily as the most experienced dissector can, and, consequently, it need never, of course, be expensive. If correctly carried out, it will not be followed by decay of any part of the body embalmed.]

In all former modes of embalming there were faults in the fluid injected, as well as in the mode of injecting it. Dr. Vivodtsef's method differs from all others—1st, In the kind of material used; 2d, In the manner of injecting it; 3d, In leaving the brain and thoracic and abdominal cavities intact.

We shall now consider *Dr. Vivodtsef's Method of Embalming*, which consists in injecting into the arteries, by means of Dr. Richardson's apparatus for local anæsthesia, a mixture of carbolic acid and alcohol. For the successful performance of the operation, the following materials and armaments are needed:—1st, Alcohol of about 90°, holding in solution one-fifth its weight of carbolic acid. The quantity of mixed fluid must equal about one-half the weight of the body. 2nd, A glass bottle (Fig. 1) capable of holding from five to fifteen pints of the above-named solution. This bottle is provided with an indiarubber stopper, which has two glass tubes, a long one and a short one, running vertically through it. The long tube (A) passes down to the bottom of the bottle, while the other and short one (B) only reaches the lower surface of the stopper. The upper ends of both tubes, after raising an inch out of the stopper, are bent at right angles to it, and then run horizontally in opposite directions. (See woodcut, p. 268.)

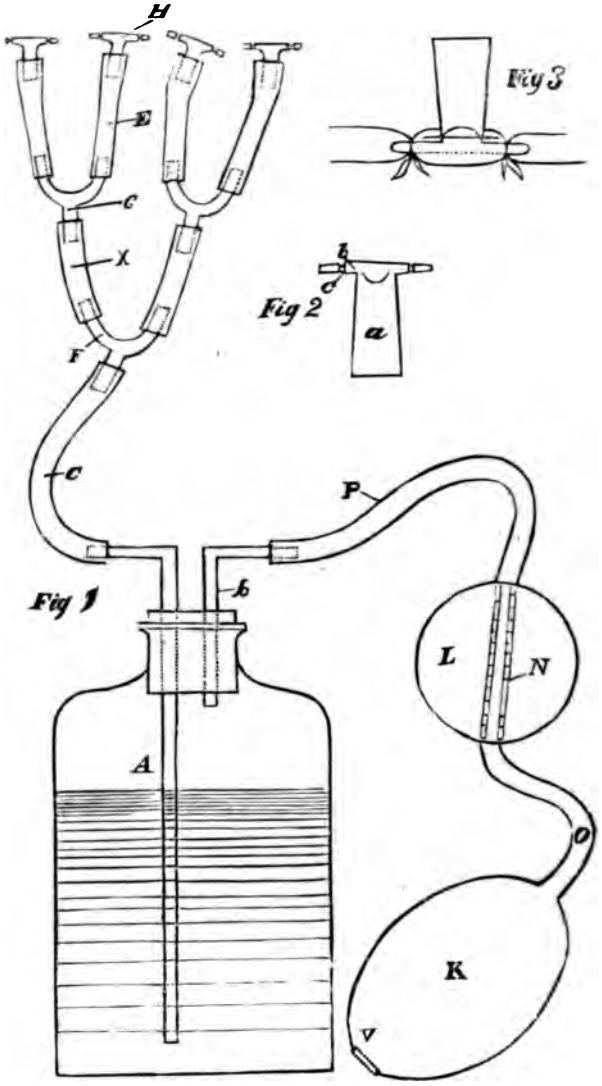
The upper extremity of the long glass tube is connected by means of about two feet of indiarubber tubing (C), with a fork-shaped copper tube (D), on the two branches (F) of which two indiarubber tubes (X), several inches in length, are slipped. Each of these tubes again has a fork-shaped metallic tube (G and G) inserted into it, and to the free ends of both metallic tubes, four indiarubber tubes (E), from six inches and upwards in length, are attached. These four tubes terminate in the small metallic canulæ, which are inserted into the arteries, and through them the fluid passes into the body. The four canulæ (H) are small brass tubes, T-shaped (Fig. 2), and varying in size according to the size of the body, or rather of the artery, we desire to inject. In the apparatus employed for embalming adults, the shaft (*a*) of the tube is about four times the thickness of its branches (*b*, *b*), which vary in breadth from the sixteenth to the tenth of an inch. These branches are inserted into the artery, which is incised longitudinally to admit them. Each branch has a small groove (*c*, *c*) running round it, and into this groove the string used for tying the artery to the canula slips, and thus keeps the injected fluid from regurgitating.

We now pass to the consideration of that part of the instrument that is attached to the short glass tube (B), through which air is pumped into the bottle with a pressure sufficient to send the fluid through the long glass tube into the arteries.

The atmospheric pressure is accomplished by the same apparatus (only made much larger) which Dr. Richardson employs for producing local anæsthesia, and consists,—1st, Of a thick-walled, very elastic indiarubber bag (K), ellipsoid in shape, about eight inches long and three wide. At its free extremity it is provided with a valve (V) which opens from without inwards. Its other end connects it, by means of elastic tubing (O), with 2nd, An indiarubber ball (L), through the middle of which passes, and to which is attached, a copper tube (N) with numerous holes at its sides. The other extremity of the indiarubber ball is connected, by means of elastic tubing (P), with the short glass tube of the bottle. This is all the apparatus required for embalming.

The process is the following:—Firstly, the urine is drawn off with a

catheter, and the rectum and descending colon washed out by means of warm water. The common carotid, brachial, and femoral arteries on both sides are then cut down upon, and their accompanying veins—the jugular, brachial, and femoral—exposed to view. A longitudinal slit, of about half an inch in length, is then made into the anterior surface of both common carotid and brachial arteries, and both jugular and brachial veins. The small T-shaped metallic canulæ are then introduced into the open mouths of the



four arteries. This is accomplished by pushing into the artery, through the incision made in it, first one branch of the canula and then the other.

Having introduced both branches in such a manner that the upper part of the shaft (now turned downwards) occupies the middle of the slit, two *ligatures* are passed round the artery—one ligature about an eighth of an *inch from* one end of the opening, the other the same distance from the op-

posite end of the opening. Each ligature is then tightened and tied, and embraces that part of the artery which covers the small groove passing round the branch of the canula (Fig. 3). The ligatures are placed to keep the canula in its position, and to prevent the fluid regurgitating through the slit in the artery. All the four arteries are secured in the same manner, but the openings in the veins are as yet left untouched.

A glass bottle, filled with the antiseptic liquid, is next placed on the table, while the ellipsoid bag and indiarubber ball are laid on the floor. The bottle is then connected with the four canulæ (now inserted into the arteries) by means of four elastic tubes (E). The connexion between the injecting apparatus and canulæ being now established, the operator places his foot on the elastic ellipsoid bag (K), squeezes the air out of it, and allows it to refill by the removal of his foot. Every time he presses on the ellipsoid bag he fills the indiarubber ball (L), whence the compressed air passes along the indiarubber tube (P), and then through the short glass tube (B) into the bottle. The compressed air presses upon the contents of the bottle, and sends the fluid, first through the long glass tube (A), then through the fork-shaped metallic tubes, and through the indiarubber tubes, and, lastly, through the canulæ into the arteries. The fluid travels along the arteries in two directions, upwards and downwards. A continuous current is thus kept up, and a gradual diminution in the contents of the bottle is soon observed. When the body begins to swell and the face to get puffy, particularly under the eyelids, the canulæ should be withdrawn, and the arteries tied at both ends of each opening. So far, however, only the carotid and brachial arteries have been injected. The operator must now proceed with the two femoral arteries, and as merely two canulæ are here needed, the four elastic tubes (E), as well as the two forked metallic tubes (G), are removed from the apparatus, and the two canulæ are inserted into the two elastic tubes (X). The process of injection is again commenced, and continued until clots of blood at first, then blood mixed with the antiseptic fluid, and, lastly, the fluid alone, escape from the opened veins. The veins are now ligatured, and the pumping of the solution into the body is continued, until an opaque, yellow brown fluid, a mixture of blood and mucus, begins to flow from the nostrils; while at the same time the operator feels the ellipsoid bag resisting the pressure of his foot. This is a sign that the viscera and blood-vessels of the body are already full, and can contain very little more liquid. The injection is continued, however, for a minute or two longer, until a clear fluid commences to escape from the nostrils, and the ellipsoid bag no more yields to pretty firm pressure.

The operation is now brought to a close. The canulæ are withdrawn, the femoral arteries ligatured in the same way that the carotids and brachials were, and all the wounds are carefully and closely sewn up. It should be remembered that in embalming the body of a child it is sufficient to inject the carotid and femoral arteries only; in an infant the femoral alone.

Changes which the Body undergoes after Embalming.—Towards the termination of the process of embalming, the post-mortem rigidity and cadaveric lividity gradually disappear, the abdomen swells considerably, the chest assumes a rounder form, the face fills up, and the eyelids become puffy, as in acute albuminuria. The skin, particularly on the face, ears, and neck, loses the waxy and semi-transparent appearance it so often presents after death, and becomes whiter and more opaque, feeling like parchment to the touch.

In a few days, however, the puffiness of the face and eyelids disappears, and the features assume their natural proportions. The parchment-like condition of the skin is permanent. The body continues in this state, without undergoing any further alteration, for three, four, or six months; after that it begins to shrivel somewhat, the features become sharper and more pinched, the cheeks fall in, the eyeballs sink deeper into their sockets, the abdomen and chest decrease in circumference, and the extremities become palpably more bony. The skin still retains its white colour, however. After six months—although sometimes not until after eight, or ten, or even twelve

—it begins to get dusky, and then its tint gradually deepens until it assumes a decidedly brown colour. The soft parts now shrink more and more, and the whole body becomes thinner and drier; in other words, it begins to mummify. In this mummified condition (in which, however, the muscles are soft and flexible) it may last for almost any number of years.

The Time required for the Process of Embalming will of course depend much upon the skill and energy of the operator, the assistance he has at hand, and the condition of the subject he works upon. Thus, if the materials be all ready; if two bottles, each connected with a separate injecting apparatus, be employed, so that the injection of femorals, carotids, and brachials can be carried on at the same time; if the body be lean; and if the operator be skilful in cutting down upon the arteries; and last, not least, if he have a smart assistant—the whole operation may be completed within an hour. Usually, however, from two to three hours are needed, sometimes even five or six, from the commencement to the end of the operation. Infants are more quickly embalmed than children, children than adults.

Points to be attended to in Embalming.—1. The fewer and the smaller the incisions made the better, as every cut in the skin allows of some portion of the injected fluid to escape through the severed capillaries during and after injection. 2. It is necessary to keep several veins open until all the blood escapes from the body, and then to tie them with a double ligature as soon as the antiseptic fluid begins to flow from their cut surfaces. 3. The fresher the body the more successful will the operation prove. When signs of decomposition have made their appearance—as, for instance, green patches on the abdomen—success is doubtful. 4. The injection should be stopped then only, when the ellipsoid bag strongly resists pressure. 5. It is well, although not absolutely necessary, to inject some of the antiseptic fluid into the rectum, and colon, and bladder.

General Remarks.—1. Fluid escapes from the nostrils for several hours, and sometimes even days, after embalming. 2. The antiseptic fluid runs pretty largely from the incisions made in the skin, particularly if the wound is not closely and well stitched. 3. There is a very strong smell of carbolic acid, which smell continues for many days after embalming. 4. The operator should have gloves on when using the injection, as carbolic acid is extremely corrosive, and quickly destroys the cuticle. Thus, even when its action has been slight on the epidermis, it takes weeks before the skin loses its roughness, the hands always presenting the appearance of being unwashed. 5. Post-mortem rigidity and cadaveric lividity disappear during embalming. 6. When the operation is over, the cheeks and lips of the corpse should be slightly touched with rouge, so as to give the face a more natural appearance.

Cost and Uses of Embalming.—The price of Dr. Vivodtsef's apparatus for embalming is from 20 to 30 shillings. The fluid (if the alcoholic solution be employed) must be estimated at, on an average, two shillings the pound avoirdupois; and of this fluid an amount equal to at least one-third the weight of the body will be required. Thus to embalm a person of 12 stone, the cost of the material would amount to about £5 12s.; to embalm a child of fourteen would cost about £2 15s.; while an infant up to its second year could be preserved for about 30s. If the carbolic acid, as lately used by Dr. Vivodtsef, be dissolved in equal parts of water and glycerine instead of pure alcohol, the price of embalming would be one-half, if not less, of the above estimate, as the glycerine need not be of the best quality.

The uses of a cheap and easy method of embalming are threefold. 1st, It will enable people to procure the bodies of those of their relatives who have died away from home free from decay, and presenting hardly any post-mortem change. 2nd, It might, as a hygienic measure, be advantageously introduced into large towns, where, as in Edinburgh and Glasgow, the cemeteries are situated in the very centre of the city, and where the dead are placed in family vaults instead of being regularly interred. 3rd, It will prove of service to anatomists, as bodies can thus be kept for many months

in the dissecting-room, without the muscles, bloodvessels, or viscera undergoing any anatomical change.—*Edinburgh Medical Journal, Dec.* 1870, *p.* 505.

123.—ON THE AFTER-TREATMENT OF CATARACT.

By HAYNES WALTON, Esq., Surgeon to St. Mary's Hospital.

The very first act after the operation should be to close the eyelids with a couple of strips of court-plaster, about an inch and a half long and a quarter of an inch wide. This insures adaptation of the wound, and supports the corneal flap. Besides this, the atmosphere is excluded, and the eye is rested. It is the simplest appliance by which the eye can be kept closed, and such closure accomplishes all that can be done for the wound without disadvantage. The tears and the aqueous humour readily escape, because some portions of the edges of the eyelids are uncovered. Bandages and compressions of all kinds are injurious. They are hurtful in proportion to their action. All pressure, beyond that which is naturally produced from closing the eyelids, must tend to be prejudicial, and, at times, to be positively damaging. Again, whatever keeps the eye hot must be bad—whatever soaks up the secretions is objectionable. I am well aware, from personal observation, that some Surgeons pack the eye with cotton wool or charpie, and subsequently apply a bandage. The system is very like the French method of treating a stump after an amputation. It is notorious how a French Surgeon packs and bandages until the limb has pounds of material over it. I fully believe that my plan ensures the highest attainable result that can be reached.

Whenever it seems necessary to protect the eye from blows from the patient's own hands, a stiff square shade, reaching from one temple to another, padded where it touches the head, and kept in position by an elastic band, will suffice. Calkin's eyeshade answers the purpose very well.

I believe it to be important that the patient be well fed, and therefore I allow him a full diet. Of course, he is carefully fed by the nurse, and does not make any exertion. It is a mistake to prescribe liquid food under the idea that chewing is hurtful to the eye, for in man the muscles of mastication cannot in any way influence the eyeball. It is different in most of the lower carnivora.

From day to day the corners of the eyelid and the cheek should be carefully cleansed. The patient should be kept in bed for the greater part or the whole of the week, but not necessarily between the sheets. When the bed is left, there is always a risk of imprudent acts. You must have observed that the principles of treatment of my ophthalmic operations differ in nowise from those of my operations in general Surgery. When I amputate a leg I do all I can to secure adaptation of the flaps, and to insure rest, by applying a splint under the limb, and I am scrupulously careful to avoid all unnecessary disturbance, all strain on the parts that are placed in apposition. Very little movement will spoil the healing of the eye or the limb.

When seven clear days have passed without unfavorable symptoms, success is pretty certain, and the plasters may be removed after they have been thoroughly softened with warm water. Then I try the sight by putting the patients back to the light, and guarding the eye while he looks at something held before him. At the same time I endeavour to ascertain whether the cornea has healed. If the chambers of the eye be filled with aqueous fluid, union must have taken place. When everything is satisfactory the plasters need not be reapplied, but if otherwise, they are required. There may be simply delay in the healing, in which case the eyelids require to be closed as much as at first.

The pernicious practice of opening the eye a few days after the operation cannot be too strongly depreçated. The examination is quite useless if the eye be doing well; if otherwise, it is certain to aggravate any evil, and in no instance can it disclose symptoms for guidance more certain and more

valuable than those of the patient's sensations and the state of the eyelid. A red and puffy eyelid is a sure indication of an inflammatory state of the eyeball, with an absence of proper repair in the corneal wound. Besides this, the angle of the cheek gets œdematous.

This after-treatment which may be said to be purely mechanical, is really all that can be done for a patient; and when the cornea does not heal kindly, the case is never perfectly successful, do what you may, and in most instances the eyeball is somewhat damaged, and only an imperfect result as regards vision is obtained. The very best sight is never got except the pupil be round and central, or nearly central. It is not enough for a patient to be able to read the smallest type under certain favourable conditions of light and position; he may do this with an irregular and displaced pupil. I want more: I wish him to be able to face a bright light without distress, and to get the light admitted to the centre of the retina, for both of which the pupil must be of the natural size, or nearly so, and central.

I will mention concisely the unfavorable conditions which may ensue:—Hemorrhage from the interior of the eyeball, irrespective of any loss of the vitreous humour; non-union of the cornea, in part or in whole, with prolapse of the iris; the giving way of the cornea after it has healed; acute inflammation of the eyeball, as a direct consequence of the operation; subacute inflammation coming on several days after the operation, which was far more common than the acute; inflammation of the entire eyeball, with suppuration. Each of these conditions require careful study and dissimilar treatment. It is not my intention to dilate on them. I may say, in a few words, that nothing is gained for the eye by violent antiphlogistic measures. When any of the untoward states which I have named exist, all chance of primary union of the cornea is gone, and whatever depresses the patient will very materially tend to lessen the prospect of his recovering any degree of sight. He is sure to be enfeebled by the adverse condition of the eye, and the constitutional symptoms are often severe. It may be said, in general terms, that only those measures which tend directly to relieve pain and to soothe are admissible. With the least chance of saving the eye, the therapeutic measure most to be relied on is rest to the wounded part—that is, the eyelids must be again plastered. This may be necessary for weeks. Many an eye is lost because this is not attended to. All else is in vain if this be neglected. I believe its simplicity is the chief reason why this, my practice, is not more generally followed. It leaves nothing for meddlesome fingers to do. While in the first week I always plaster up both eyes, in the secondary treatment, to which I now allude, I close only one. I never perform double extraction at once: my reasons against it have been given.—*Med. Times and Gazette, Dec.* 3, 1870, *p.* 637.

124.—OBSERVATIONS ON THE SKIM-MILK TREATMENT OF DIABETES MELLITUS.

By Dr. Arthur Scott Donkin, Lecturer on Medical Jurisprudence and Toxicology to the University of Durham.

[Dr. Donkin's first article upon this subject will be found at page 104, *Retrospect*, vol. lxi. The subject is so interesting and important that we are surprised no further notice of it has been taken by the profession, than a short one by Dr. George Balfour of Edinburgh. (See *Retrospect*, vol. lxi., p. 107.) In the case treated by him the improvement is stated to have been "very remarkable," but the patient only remained under his care a few days, and the treatment was not fairly tried. The fact is extraordinary that both the following cases were *cured* within fourteen days after beginning the treatment.]

Case 1.—Diabetes mellitus; removal of the sugar from the urine in fourteen days; complete recovery.—Mr. J. G., aged fifty-eight, a highly respectable

merchant, of large, robust, muscular build, and of regular and temperate habits. He has devoted himself very successfully to business pursuits, with all the anxiety attendant thereon.

For two years prior to May, 1870, this patient had grown much stouter and shown a decided tendency to corpulency, and, to use his own expression, "had been very bilious." He suffered much during this period from loss of energy and fatigue on exertion, always feeling dull, heavy, and languid, sleepless at night and drowsy in the daytime. This general indisposition he attributed to his habits having become much more sedentary and his application to business much closer. He took no stimulants whatever during the daytime, but in the evening, at dinner and after it, he took daily a pint of bitter ale and one or two glasses of whisky, but never more than this quantity.

This condition of general debility and suffering, just described continued until the beginning of May, 1870, when the patient's health completely broke down, and his feeling of debility increased so greatly that he could with extreme difficulty walk in the morning after breakfast between his own residence and his place of business, a distance of about half a mile.

This condition continued until the 14th of June (about six weeks), when I was called in consultation with Mr. M. Francis, surgeon to the Sunderland Police Force, when we found the state of the patient to be as follows:—He was unable to attend to business and could not walk more than a quarter of a mile without taking a rest. He suffered much from a dull heavy pain across the forehead, with a painful dragging sensation in the face, or as if something was dragging down his cheeks. There was great dimness of vision and loss of energy, no sleep at night (although he slept occasionally towards morning), coldness and numbness of the limbs, and loss of sensation on the anterior surface of the thighs. There was not excessive thirst nor inordinate appetite; the skin was somewhat dry and not perspiring; the gums were spongy, and the teeth loose. There was nothing abnormal in the state of the pulse, and no organic disease could be detected.

Such were the general symptoms; and a careful examination of the urine revealed the nature of the disease. The daily quantity of urine varied from eight to ten pints; and its specific gravity was from 1035 to 1040, and it was loaded with sugar. The case was, therefore, unquestionably one of diabetes mellitus.

On the following day (the 15th of June) the skim-milk treatment was begun; and, on account of the large muscular frame of the patient and his sharp appetite, from eight to ten pints were taken daily, and at the ordinary temperature. The cream was taken off carefully after it had stood a sufficient length of time, and according to directions. *All other food was scrupulously refrained from;* and no medicine whatever was in this case prescribed. This treatment (an exclusive diet of skim-milk was persevered in *without variation or intermission for a period of five weeks.*

And now let us consider with what result.

At the end of the first week of the treatment, the urine had fallen in quantity to six or seven pints daily (the quantity being always in direct ratio to that of the daily consumption of milk), and its specific gravity was reduced to 1015, the quantity of sugar having undergone a very great diminution.

At the end of the second week (June 28th), or *fourteen days after the commencement of the treatment, the sugar had completely disappeared from the urine;* not the slightest trace could be detected on the most careful examination. The specific gravity of the urine was now reduced to 1009 and 1010 daily, the quantity ranging from six to seven pints according to the quantity of milk taken daily; but whenever the quantity exceeded seven pints the specific gravity was always below 1010. From this date the sugar continued absent from the urine.

As regards the general symptoms of the disease already enumerated (most of which were referable to the nervous system), they gradually diminished, and at length completely disappeared within a fortnight, and were

succeeded by a feeling of perfect health, accompanied by profound refreshing sleep at night. The lethargy, too, entirely disappeared.

One of the most remarkable changes produced in the patient's condition was the restoration of his strength; *at the end of a month he walked seven miles without once resting, and without fatigue* or subsequent injury; his diet having been all the while exclusively skim-milk, as already stated.

At the commencement of the treatment the patient was flabby and inclining towards obesity; but two months afterwards his flesh was firm and compact, his features presenting a ruddy healthy hue, instead of his previously yellow, pasty look; his gums and teeth regained their firmness.

As already stated, the skim-milk treatment was continued for five weeks. At the end of this period from two to three pints of the daily allowance of milk (from eight to ten pints) were converted into curd by the use of Proctor's essence of rennet; this curd was taken at two meals, and it assisted materially in filling the stomach, and was thus very grateful to the patient. This slight change was continued two weeks; but, as it was a mere modification of the milk diet, the latter may be said to have extended over a period of seven weeks.

At the end of seven weeks, and as an *addition* to the milk and curd diet, still continued, a dinner was allowed, consisting of about three-quarters of a pound of beef or mutton roasted, or steak or chop, with a moderate quantity of green vegetables (cabbage, greens, lettuce, spinach, &c.) This change of diet did not cause any return of the sugar in the urine, but contributed much to increase the strength of the patient, and was very grateful to his appetite.

Since the disappearance of the disease, on the 28th June, up to the present time (January, 1871), a period of more than six months, the patient has continued and still continues in exc llent health, and sugar is still absent from the urine, which is subjected to a weekly examination. Additions have been made to his diet, but all articles containing starch and sugar have been excluded as far as practicable. At present he is taking the following diet daily:—For breakfast: ½ lb. of mutton chop, a pint of milk, and about ½ pint of coffee. For lunch: ½ lb. of potted head or potted meat and a pint of milk. For dinner: about ¾ lb. of roast beef or mutton, chop or steak, fowl or turkey, with green vegetables (brussels sprouts, cabbage, &c.) After dinner, up to bedtime, tea and a liberal quantity of milk are taken. Six pints of milk are consumed daily; from this the greater portion of the cream has been separated. Under this diet the health of the patient is excellent, and he has gained considerably in healthy flesh, the obesity and flabbiness having quite disappeared. This dietary will be continued for some time longer, until it is considered safe to introduce articles of diet containing starch or sugar.

Case 2.—Diabetes mellitus; removal of the sugar in twelve days; complete recovery.—Mr. D. S., a highly respectable and prosperous tradesman in Newcastle-on-Tyne, of robust, muscular build, and of temperate habits, but much confined within doors by his business. His health had generally been good until January, 1870, when he began to suffer much from general indisposition, and when he placed himself under a medical practitioner, who ascertained that he was suffering from diabetes, but did not prescribe a dietetic treatment, or produce any amelioration of the condition of the patient.

On April 15th he consulted an experienced surgeon in Newcastle. At this time his weight was 11 st. 10 lb., and he passed daily from six to seven pints of urine having a specific gravity of 1040 to 1045. He suffered from dry skin and excessive thirst (not greatly increased appetite), great dimness of vision, and almost complete loss of sleep. He had a dull, heavy, aching pain over the loins, great listlessness, entire loss of energy, and experienced great fatigue on the slightest exertion.

The patient was now placed under Rollo's dietetic treatment, consisting of animal food—beef and mutton,—of which he partook about 2½ lb. daily *in four meals*, with the addition of two or three of Camplin's bran biscuits *to each meal*; tea was allowed, and also a pint of claret daily, and occa-

sionally a little brandy and cold water. Bread, sugar, and all food containing starchy matter, were strictly prohibited.

On the 19th April (four days after commencing this treatment) his weight was 11 st. 5 lb.; and on the 25th, 11 st. 10 lb.

The effect of the treatment was to diminish the daily quantity of urine to 4½ pints on an average; but its specific gravity never fell below 1038, and continued to be abundantly impregnated with sugar. The patient, however, experienced considerable relief from the general symptoms of the disease up to the 25th of July; but the disease itself showed no indication of yielding, and was pronounced incurable. At this period he became much worse, there being a great aggravation of all symptoms of the disease up to the 3rd of August, when he first came under my observation.

When, at the date just mentioned, he consulted me, I found the patient suffering from all the symptoms already detailed, and from which he was suffering when placed under a dietetic treatment in the beginning of April. He was passing from six to seven pints of urine daily. The specific gravity on the 3rd of August was 1040.

On the 4th of August, the day following, I placed him under the skim-milk treatment. He was allowed six pints daily, from which the cream had been carefully separated, after standing eighteen or twenty-four hours in a cool place. *All other food was strictly prohibited*, and stimulants were disallowed.

Report.—Aug. 3 (day before the treatment was begun). The urine was loaded with sugar. There was a great thirst, a dry skin, no sleep at night, loss of energy, and great fatigue on exertion. Quantity of urine 6 pints, sp. g. 1040.

5th (the day after the commencement of the treatment). Not much improvement in general symptoms; but the urine was reduced 2½ pints in quantity and ten degrees in specific gravity.

8th. The quantity of sugar in the urine very much diminished; *thirst gone;* skin moist and perspiring, especially at night. Had slept soundly on the previous night; listlessness much less, and feels as if he had got rid of a load. 4½ pints, sp. g. 1013.

10th. Much less sugar in urine. A great improvement in every respect. 4½ pints sp. g. 1013.

13th. Sugar reduced to a very small quantity. Thirst quite gone since the 8th. Skin continues moist; sleeps soundly every night; vision improved; pain in the loins gone; feels much more energetic and active; takes a long walk daily without fatigue. 3½ pints, sp. g. 1015.

15th. Only a mere trace of sugar observable in the urine. Continued improvement, especially in strength. 4½ pints, sp. g. 1011.

18th. Sugar totally absent from the urine; still improving in strength and energy; has no desire for more food. 3½ pints, sp. g. 1016.

20th. Sugar continues absent; "feels quite well;" can walk a long distance without fatigue. The daily allowance of skim-milk increased to seven pints. 4 pints, sp. g. 1014.

23rd. No sugar; keeping quite well. After consulting me on the 20th he walked to Whitburn, and then to Cleadon Station (about five miles), without fatigue. 5 pints, sp. g. 1010.

29th. No sugar; feels quite well. 5 pints, sp. g. 1010.

31st. As before. 5½ pints, sp. g. 1013.

Sept. 3rd. As before. Now allowed, in addition to seven pints of skim-milk daily, two pints of the same made into curd by essence of rennet. 3 pints, sp g. 1019.

6th. No sugar; quite well. Has taken much exercise daily, and perspires freely. Bowels constipated, and relieved by castor oil. 2½ pints, sp. g. 1023.

12th. No sugar; feeling well and strong. At this period the patient was examined, as well as his urine, by my neighbour, Dr. Charles Natrass, of Sunderland, who considered him cured of the disease. The patient, moreover, declared to Dr. Natrass and myself that, on the 6th of Sept., he had

walked from my house by the sea-shore to South Shields, a distance of nearly eight miles, without fatigue, and after having lived on skim-milk solely for forty-one days. He further declared he could not have done this feat three years previously, when in health and living generously. 3½ pints, sp. g. 1019.

15th. No sugar in the urine; weight 11st. 10 lb.; health excellent. The patient had now lived solely on a skim-milk diet for a period of thirty-two days, and on skim-milk and curds solely for an additional twelve days, in all forty-four days (six weeks and two days).

On Sept. 16th he was allowed, as an *addition* to the skim-milk and curd diet, half a pound of mutton chop to dinner.

Sept. 19th. No sugar in the urine; patient continuing well; takes daily, with the chop, five pints of skim-milk in the liquid form, and from two to three made into curd. The change in the diet diminished the quantity of urine and raised its specific gravity. 3 pints, sp. g. 1020.

23rd. Urine free from sugar, but containing a deposit of uric acid crystals. 2½ pints, sp. g. 1026.

27th. Patient perfectly well; has been drinking more milk; allowed the green part of cabbage, greens or lettuce to dinner, with butcher's meat. 4½ pints, sp. g. 1017.

30th. As before. 2½ pints, sp. g. 1024.

Oct. 3rd, 10th, 23rd, and 29th. No sugar in the urine; health excellent; has been taking much out-door exercise; now allowed Van Abbott's gluten bread to dinner, as an addition to the food last mentioned. 3½ to 4½ pints, sp. g. 1024, 1015.

November 2nd and 10th. No sugar in the urine; health excellent. It was now considered unnecessary to keep a regular record of the case. 3½ to 4 pints, sp. g. 1024, 1018.

Since the above date the patient has been constantly under my observation, and a weekly examination of the urine has been made; and at the period I now write—January, 1871,—nearly seven months after the patient's recovery, the disease has not returned, and the patient is in excellent health, notwithstanding the fact that he has partaken daily of a mixed diet, though carefully regulated to exclude, as far as possible, starch and saccharine matter, and also fat, except to a small amount. The dietary on which he was placed, and on which he is now living, is as follows:—Five to seven pints of skim-milk daily (two or three pints of it converted into curd by essence of rennet); eggs (occasionally a portion of the curd and of the eggs are made into puddings); tea and coffee, with skim-milk; a meal of roast beef or mutton, chop or steak, turkey or chicken, with green vegetables, such as the green part of cabbage, greens, brussels sprouts, lettuce, spinach, &c. Tea has been taken in the evening, and supper has consisted of curds and milk. With this diet the patient is vigorous and quite contented.—*Lancet*, *May* 6, 1871, *p.* 603.

125.—ON A SERIES OF CASES IN WHICH CHANCRES (?) HAVE FOLLOWED VACCINATION.

By J. Hutchinson, Esq., Surgeon to the London Hospital.

(*Read before the Royal Medical and Chirurgical Society.*)

On the 7th February thirteen persons (young adults were vaccinated from the arm of a healthy-looking infant. All, except one, had normal vaccine vesicles, which healed well. In all, except two, indurated chancres have since developed in the vaccination scars. In nearly all, the scar began to inflame and harden during the fifth or sixth week. Several of them have two or three chancres.

The infant (vaccinifer) now has condylomata at the anus, and is beginning to waste (age six months). She is undoubtedly the subject of *inherited* syphilis, the taint having been latent at the time of vaccination.

None of those vaccinated have as yet shown any persistent secondary rash, but several have been feverish for a day or two, and have had transitory roseola. In all, the sores are disappearing under mercurial treatment.

The two who escaped the syphilitic contagion were the two first vaccinated, and probably they received pure lymph, whilst the others received blood as well. It is known that the vaccinifer's spots bled during the vaccination.

The inferences from the cases were—1. That the blood of a child in the latent stage of inherited syphilis is capable of producing primary syphilitic sores in its recipients, and is indeed remarkably efficient as a means of contagion. 2. That the vaccine virus itself, even when taken from a syphilitic subject, produces nothing but the true vaccine disease. 3. That the two poisons may be conveyed (in two fluids) at the same time, and may each produce its specific effects.

Dr. BAKEWELL called attention to the possibility that syphilis might be conveyed in vaccination not by blood only, but also by the mingling of epidermic scales from the vaccinifer with the lymph. He suggested also that the vaccinifer might receive syphilis from the vaccinated if the lancet that had drawn blood from the latter was introduced into the vesicle to obtain its charge of lymph.

Mr. HENRY LEE thought Dr. Bakewell's suggestion about the possible conveyance of syphilis by epithelium scales was well worthy of attention. He commended Mr. Hutchinson's courage in bringing these cases before the Society. In this country there was much difference of opinion about the production of disease by vaccination; and while many disbelieved that syphilis could be communicated by vaccine matter, their incredulity was confirmed by the official reports. There was, however, a very general belief that impure blood would be injurious; and it was very desirable that the conditions under which harm could be done should be fully made known, in order that medical men might be protected from undeserved obliquy. Mr. Hutchinson had said that if nothing but vaccine lymph were taken, even from the arm of a syphilitic child, nothing but cow-pox could be communicated. He himself would go still further, and would say that if small-pox and cow-pox were co-existent in the same subject, only cow-pox would be communicated by lymph from the vaccine vesicle. There could be no doubt, however, that vaccination might call previously latent disease into activity; and in this way it might appear to convey syphilis when it had not done so in reality. He had seen three cases in which syphilis was supposed to have been communicated by vaccination; and he thought induration of the axillary glands unusual, although possibly to be accounted for by the part of the arm on which the vaccination had been performed.

Mr. DE MERIC joined with the last speaker in congratulating Mr. Hutchinson upon his courage in bringing forward the facts; and thought that the paper would change the opinions of many persons who had previously been incredulous about the conveyance of syphilis by vaccination. He thought, however, it would have been better to have delayed the publication for a few weeks, in order to see whether any secondary symptoms would have appeared in the vaccinated person. He did not believe that it would be safe to use the vaccine lymph yielded by a syphilitic subject; because the vaccine lymph was formed from the blood, and might therefore possibly become a channel for the communication of disease. At the same time, it must be remembered that the sores formed by vaccination sometimes assumed various unusual appearances; and it should not be hastily concluded that these were due to syphilis. There could, notwithstanding, be no doubt that syphilis might be communicated by vaccination; and such an occurrence had taken place in Brittany. The facts had been investigated by a commission of the Paris Academy of Medicine, and had been placed beyond all question.

Mr. BRUDENELL CARTER said that the canon of medical orthodoxy, as regarded vaccination, had hitherto been founded upon three cardinal points of belief. These were, that the relation between the vaccinifer and

the vaccinated was the only human relation, that the transference of vaccine lymph was the only mode of human intercommunication, and that the vaccine lymph itself was the only human secretion, by which syphilis could not be conveyed. For his own part, encouraged by the well-known maxim of philosophy, that the multitude of people who believe in a thing do not in the least add to its credibility, he had long had the hardihood to dissent from all three propositions, and he thought that the first two, at least, had now been shown to be utterly untenable. Mr. Hutchinson still gave the weight of his authority to the last; but in doing so he surely rested a very wide generalisation upon a slender basis of fact. It was difficult to discover any reason for the distinction so much insisted upon between blood and lymph; and it was the practice of many vaccinators, after having taken the first yield of a vesicle, to wait for a few minutes until another drop exuded, a drop that could be nothing but liquor sanguinis, containing all the essential constituents of the blood, and also carrying the peculiar morbid products of the vesicle. Moreover, a few years ago, when he was in the habit of vaccinating, and occasionally sent for tubes of lymph to the Privy Council, the liquid supplied to him was always turbid, often inert, and, on one occasion, he believed, had been mingled with saliva and buccal mucus. He attributed the ordinary turbidity to over-filling of the tubes. To his mind, considering the wide diffusion of syphilis, its occasional invaccination was a matter that could only be prevented by a full recognition of the possibility of the occurrence, and by the most stringent precautions with regard to it. The chorus of "*Je n'ai jamais vu*" was alone almost sufficient to prove that those who joined in it had not turned their eyes in the right direction; and was pernicious as a cause of carelessness in the selection of vaccinifers. The public would not receive the full benefits of vaccination until the dangers connected with it were candidly admitted, dispassionately studied, and carefully guarded against.

Dr. DRYSDALE said that he had once vaccinated a syphilitic child, and had given strict injunctions that no lymph should be taken from it. He afterwards heard that it had been taken to a public institution, where his caution, although mentioned, was disregarded, and that several others were vaccinated from it.

Mr. SIMON said that the statements made with regard to the lymph supplied by the Privy Council were such as could not be substantiated. In the course of a speech of more than half-an-hour's duration he repeated the already published history of his circulars of inquiry about the invaccination of syphilis; and threw out the suggestion that the products of inflammation might be sources of danger, and that hence the use of tenth-day lymph, not infrequent upon the Continent, might be a reason why there had been more evidence of the communication of syphilis abroad than in England.—*Lancet*, *May* 6, 1871, *p.* 613.

At a meeting of the Committee appointed to investigate this subject—

After detailing the cases of vaccinal syphilis, Mr. JONATHAN HUTCHINSON, expressed his faith in vaccination in the strongest terms. He informed the Committee that the danger of vaccinal syphilis was infinitesimally small, that he had vaccinated all his own children, and should continue the practice. He was of opinion that the stringency of the law should not be relaxed; but that it should be an object of legislation to surround the operation with every possible safeguard. Amongst other provisions for preventing the introduction of syphilis, he would prohibt the taking of lymph from any first-born child, and recommend that it should in all cases be taken from second or later children, in families of which the eldest had enjoyed a good state of health. This would reduce the probability of transmitting syphilis by vaccination to the very lowest point.—*Lancet*, *May* 13, 1871, *p.* 664.

126.—ON THE CASES OF ALLEGED VACCINO-SYPHILIS.

By the EDITOR OF THE LANCET.

In the first place we would urge that, from a scientific point of view no less than from considerations of expediency, it is necessary to require the production of very stringent proofs before admitting the syphilitic character of the sores produced by these vaccinations. As to expediency, we need hardly say that it is a most serious, and if needlessly done a most criminal, act, to let loose among the public the terrorising idea of possible syphilisation through vaccine. The example of Paris is before our eyes. The French scientific *dilettanti* frittered away the confidence of the public in vaccination by long-winded debates on a supposed epidemic of vaccino-syphilis, which turned out to be a complete mare's-nest. And the consequences have been terrible: vaccination was completely neglected, and small-pox has scourged Paris in a manner that reminds one of the mediæval plagues. That a very similar series of events would occur in this country if once the official declaration of a representative Medical Society confirmed the existence of a genuine vaccino-syphilis, we can have little doubt from the mischief which has been already accomplished even by the rash and ignorant assertions of a few medical men who possess not the least scientific knowledge on the subject. All this is no reason for concealing the fact of vaccino-syphilis, if fact there be. But it does throw a most heavy responsibility, which we feel it our duty to point out clearly, on those who bring forward alleged instances of the disease; and the least vestige of scientific levity, or of a tendency to accept inadequate proof, ought to be visited with the sharpest reprobation.

So much for the question of expediency; and now as to the question of fact. We are not aware that, so far, any decisive evidence has been produced that could prove the sores in question to be syphilitic. For our own part, we know of *no characters whatever* that would prove the syphilitic nature of any sore on the arm following an irritant wound, unless there were clear constitutional symptoms of syphilis. The most experienced syphilogue in the world has no right to affirm, from the mere aspect of any sore following an irritant wound, that it is syphilitic. Such sores are constantly observed, presenting the hardened base and the peculiar margin which are seen in the indurated chancre, and cicatrising precisely in the form of the "fungoid" eminence or "bouton" which follows the true syphilitic sore; and yet the observer knows that the primary lesion could not by any possibility have been syphilitic, and he finds that no constitutional symptoms follow it. Such was the nature, most unquestionably, of the sores produced by those unhappy vaccinations in Brittany in 1866, which caused such a terrible hubbub, and produced the disastrous debates in the Acedémie de Médecine. And we have been independently informed by three different London practitioners, who have been largely engaged in vaccinations during the past six months, that a comparatively common phenomenon of vaccination has been the formation of an extremely ugly-looking sore, which exactly resembled a syphilitic chancre, both in the open and in the healed state, but which (out of some score of cases) entirely and perfectly subsided without a vestige of evil result, though several months have now elapsed. This is only a corroboration of what we ourselves have repeatedly witnessed in former days. Now, at present, Mr. Hutchinson's cases have presented no more diagnostic phenomena than the above, *plus* a certain amount of roseola (of itself by no means distinctive) and a doubtful amount of "headache and pains in the limbs" in two or three cases. Assuredly, something much stronger than this is needed! and we hold that the Medical and Chirurgical Society will gravely fail in its duty if it admit the syphilitic nature of these affections without a far more cogent proof.

The other point, to which we would draw the attention of the general profession and of the public as strongly as that of the Medico-Chirurgical Society, is this: that, even supposing it shall ultimately appear that very

rare instances of true syphilis from vaccination do occur, there is every probability that the accident would be found to depend on the accidental admixture of the blood of the vaccinifer with the lymph. Such an occurrence is the result of culpable carelessness, and will become impossible when once a proper amount of knowledge and a sufficiently conscientious spirit of carefulness have been diffused among the profession. Even if it does at present with exteme rarity occur (which is very far indeed from being proved), it affords no argument whatever against vaccination; it simply illustrates that want of perfect education as to the requisites for first-class vaccination which makes a few practitioners still careless enough occasionally to take up blood as well as lymph from the vaccinifer. The danger even if it exists, is already infinitesimal, and will shortly be removed altogether.—*Lancet, May* 6, 1871, *p.* 618.

SYNOPSIS,

(ARRANGED ALPHABETICALLY), CONTAINING

A SHORT ABSTRACT OF THE MOST PRACTICAL ARTICLES IN THIS VOLUME, SHOWING AT A GLANCE, THE MOST IMPORTANT INDICATIONS OF TREATMENT PUBLISHED BY DIFFERENT WRITERS WITHIN THE HALF-YEAR.

AFFECTIONS OF THE SYSTEM GENERALLY.

CANCER.—*Hydrate of Chloral.*—Hydrate of chloral, in doses of ten to twenty grains three times a day, relieves the pain of cancer without interfering with the digestion and producing vomiting, as opium not unfrequently does. (Mr. W. Cooke, p. 230.)

EPIDEMICS OF CHOLERA AND FEVER INCOMPATIBLE.—Mr. Lawson, Inspector-General of Hospitals, has observed in India that epidemics of fever have no influence in checking the advance of those of cholera, and *vice versâ*. Fever has frequently prevailed over an extensive area, and though cholera, also embracing a large area, approached the other, yet, while the fever continued, epidemic cholera, as an epidemic, has never penetrated the fever field. It appears as if the conditions which generate fever epidemics are incompatible with those which generate epidemics of cholera. Sometimes the one set of conditions, sometimes the other, exists over a large area of the earth's surface, and the one will give way to the other without any marked change in the habits or circumstances of the population those areas embrace. (Mr. R. Lawson, p. 49.)

SCARLATINA.—*Etiology.*—It appears not improbable that blood decomposing under certain states, is a factor in the production of scarlatina, *de novo*. When so produced, it, of course, spreads by infection. A number of instances are given in which the disease appeared to commence from the exposure of offal, decomposing blood, or washings from slaughter-houses left to decompose in the open air. In one case there was an epidemic in a village, the public-well of which was proved by analysis to be contaminated with matter from a neighbouring slaughter-house. It appears to be accepted as a determined fact that bad drainage, although everything in the production of typhoid, has no effect in the production of scarlet fever. (Dr. A. Carpenter, p. 17.)

SMALL-POX.—*Effects of Vaccination in lessening the Mortality from.*—Out of 800 cases of small-pox admitted to the Hampstead Small-pox Hospital during rather less than three months, 591 had been vaccinated, of these 58 died, being a percentage of 9·8. 209 were unvaccinated, of whom 96 died, being a percentage of 45·8. The difference is perceptible enough. (Dr. Grieve, p. 46.)

TYPHOID FEVER.—*An unsuspected source of Typhoid.*—A very singular source of propagation of typhoid is described by Dr. Ballard, of Islington. An epidemic of fever broke out in a locality in Islington, and it was noticed that it was confined to the customers of a certain dairyman. The water used by him (of course only for washing his cans) was found to be contaminated with drainage matter. Dr. Ballard's report of his investigation is extremely interesting. (p. 31.)

Sulphurous Acid in Typhoid Fever.—If sulphurous acid is given perseveringly for a week or ten days in doses of from two and a-half to twenty min-

ims according to age, every four hours, the system becomes saturated with it, and the further development of the fever poison is arrested. The patient will complain of tasting or smelling sulphur, and infants will emit the odour of the gas from their skin and breath. In one summer, over 170 cases were thus treated, and only one died—an habitual drunkard. In only one case did diarrhœa set in during the sulphurous acid treatment without having previously existed, but this patient had old standing renal disease. In some of the early cases the acid was left off after a few days use, because the patient seemed better. In almost all such cases they had a relapse, which was again immediately arrested by the resumption of the acid. (Dr. G. Wilks, p. 41.)

Zymotic Diseases.—*Sulpho-Carbolates.*—Dr. Sansom continues to use the sulpho-carbolates in the zymotic diseases. He finds them capable out of the body of destroying the vitality of the germs of disease, and believes them to have the same property within the body. He gives the mode of preparation of sulpho-carbolic acid, which forms a series of stable salts, with most of the alkalies, alkaline earths, and metals. They have not yet received the attention at the hands of the profession which they deserve. (Dr. A. E. Sansom, p. 24.)

The sulpho-carbolates are extremely soluble, and are administered with the greatest ease, a drachm of sulpho-carbolate of soda (equivalent to about twenty grains of carbolic acid) has been given to an adult patient every four hours. To a child seven years of age ten grains every four hours is the proper dose. (Dr. Sansom, Obs. Trans. p. 6.)

AFFECTIONS OF THE NERVOUS SYSTEM.

Cases of Severe Abdominal Neuralgia.—Cases of severe abdominal neuralgia occur not unfrequently amongst the poorer classes, and much resemble peritonitis. The pain is generally acute, the tongue moist, the abdomen very tender on pressure, not tympanitic, although this is sometimes the case. The temperature is generally only a little higher than natural, but a high temperature is occasionally present. In three cases the pulse was 78, 102, and 80 respectively. It is very important that these cases should be recognised. The previous history of the patient is generally of service in the diagnosis, as there is always some cause of exhaustion; also the posture, for the patient will lie with her legs extended, or will double herself up, neither of which positions are seen in peritonitis. Soothing warm applications externally, and opiates internally are generally successful in relieving the pain, and repose and good nourishment in completing the cure. (Dr. H. Jones, p. 71.)

Chorea.—*Chloral.*—Chloral is the most prompt and efficacious remedy in intense chorea, when the life of the patient is threatened. (M. Bouchut, p. 236.)

Ether Spray to the Spine.—Apply the anæsthetic ether spray along the spine for four or five minutes at a time. It produces a strong impression on the nervous system, interrupting the series of morbid actions going forward. In a case treated in this manner successfully, fifteen sittings were required. (Dr. J. Rose, p. 75.)

Degeneration of Nerve Structure from Injury—(*bearing on Railway Accidents.*)—The author shows that, if the posterior root of one of the spinal nerves is divided between the ganglion and the cord, the root degenerates, and that after a time its continuation upwards in the cord also degenerates. If the same thing is done on the anterior columns, no degeneration in this direction takes place. The law is, that the degeneration takes place in the direction of the physiological activity. If a sensory nerve is injured by an accident, degeneration is liable to take place centripetally, until the ganglion on the posterior root becomes destroyed, the degeneration *then proceeds* up the cord to the brain. A case of this kind is related

where a finger was crushed, and the case ended in loss of vision and speech, paralysis, and death eighteen months after the accident. These progressive degenerations generally extend over several years. Not only injury, but excessive activity, or exhausting use of the sensory nerves and ganglia will affect the nutrition of the sensory fibrils. (Dr. T. Laycock, p. 61.)

LIGHTNING-STROKE.—In lightning-stroke there is liberation of gases from the blood; distension of veins in all parts; pressure on the brain in the closed cavity of the skull, and insensibility as the result of the pressure. The opening of a vein at once relieves all this embarrassment, and the distended right side of the heart is set at liberty to re-commence its contractions, the nervous centres are relieved, and if the blood is not actually disorganised, nor organic structure ruptured, the natural functions are restored, and life is saved. (Dr. B. W. Richardson, p. 76.)

MANIACAL EXCITEMENT.—*Bromide of Potassium and Cannabis Indica.*—Bromide of potassium and cannabis indica, given together, have a most powerful effect in controlling maniacal excitement. The combination has an essentially different action from that of either of them given alone. Immense and almost dangerous quantities of bromide of potassium alone are required to produce an equivalent effect, and there is this disadvantage, that the effects are cumulative and increase for days after the medicine has been stopped, almost paralysing the cerebrum and sympathetic. The usual dose of the combined drugs is one drachm of the bromide and one fluid drachm of the tincture. Opium is not suitable in these cases, for it requires large doses to produce the desired effect, and when it is necessary to continue it for some time it soon ceases to act as at first. This is not the case with the combination recommended. (Dr. T. S. Clouston, p. 68.)

SEA-SICKNESS.—*Chloral.*—If it is wished to avoid sea-sickness in short sea passages it is only necessary to take an ordinary dose of chloral, and sleep during the voyage. Chloral is of great value, however, even during prolonged sea voyages, giving a good night's rest, arresting violent sickness when it has set in, and stopping the tendency to its recurrence. (p. 262.)

SUNSTROKE.—In cases of severe sunstroke as observed in England, with livid face, and prominent veins, there is no remedy like the old one, venesection. The veins, standing out from the extreme blood pressure within, almost offer themselves to the operator. Probably many a case now fatal would be saved if the practice were more commonly adopted. (Dr. B. W. Richardson, p. 76.)

TETANUS NEONATORUM.—Chloral hydrate in doses of one to two grains at a time of each onset of convulsions is the most successful plan of treating this disease. Six cases out of ten or twelve recovered under this treatment, all the others died. (Dr. Widerhofer, p. 67.)

DISEASES OF THE CIRCULATORY SYSTEM.

ANEURISM.—*Atheroma as a Cause of.*—It would be going too far perhaps to discard the influence of atheromatous degeneration altogether, but certainly, aneurism as met with amongst soldiers frequently exists quite independent of that form of disease of the inner coats of the arteries; and destruction of large portions of even the whole three coats may take place by an acute process, and without a trace of atheroma in the neighbourhood. (Inspector-General Lawson, p. 87.)

CARDIAC CONGESTION.—There are cases of cardiac congestion, with enfeebled right side of the heart, in which under certain conditions there is sudden embarrassment of the circulation, oppression of breathing, tenseness of veins, and threatened death. The body is dusky, the eyes injected, the passive oppression intolerable. The removal of a few ounces of blood will give inexpressible relief, and so far from "reducing" it seems to act quite the other way. (Dr. B. W. Richardson, p. 78.)

NÆVI.—*Removal by the Ecraseur.*—The removal of large nævi may be effected with ease by means of the écraseur. Two hair-lip pins must first be passed through the base of the tumour, and the chain of the écraseur be passed below them. It is well to make a very shallow incision through the skin (to the depth of ¼ of an inch), as it is not easily divided by the chain. The chief advantages are the linear cicatrix which results, and the small amount of hemorrhage. (Mr. J. F. West, p. 191.)

Injection of Perchloride of Iron.—Injection of perchloride of iron by means of a fine syringe is undoubtedly one of the best means of curing large nævi. If the instrument invented by Dr. Brandt, of Oporto, be employed, all danger of death from embolism is avoided. It consists of two blades on the principle of the Entropion forceps, one of which is to be passed behind the tumour (supposing it to be situated in a part in which it can be so placed), whilst the other, which is fenestrated, passes over or around it. The tumour bulges, of course, through the fenestrum, when the blades are brought together by means of a few turns of the screw in the handles. The perchloride may now be injected with perfect safety, and if the tumour is large the process may be repeated as often as necessary. This plan is peculiarly suitable for nævus on the lips and cheeks. (Dr. Brandt, Practitioner, Dec., p. 348.)

TORSION OF ARTERIES.—The author has now systematically for four years twisted every artery in his operations, including nine cases of amputation of the thigh; and without a single case of secondary hemorrhage. His mode of procedure is as follows. He uses forceps like the ordinary torsion forceps, but the blades are broader and stronger than those usually seen, and terminate in broad well-rounded points. Each vessel is seized and rapidly twisted some six or seven times, the wrist turning with the demi-circuit some twelve or thirteen times, until in fact the operator feels something "give." The safe completion of the torsion is tested by the operator seeing the twisted bit of tissue pulsating away in the face of the flap. (Mr. C. Forster, p. 132.)

AFFECTIONS OF THE RESPIRATORY SYSTEM.

GREY AND YELLOW TUBERCLE.—Grey and yellow tubercles are not distinct species of tubercle, but merely stages or varieties of the same thing. The real element in the question is the element of intensity. A tubercle not very intense is grey at first, and by age becomes yellow, but it may always remain grey. A tuberculous deposit very intense in its nature from the first is yellow, and there is no previous grey stage. It is an analogous thing to the production of lymph or pus, by a variation in the intensity of the cause. The yellowness which occurs in grey tubercle by age is a fatty degeneration taking place slowly in the original elongated and fibre-shaped elements. The yellow tubercle from the first is composed of round cells with no plastic tendency to elongation, and very early becomes fatty. All tubercles are inflammatory in their origin, just as much so as a herpes or psoriasis; and in cases of pneumonic phthisis we find tubercles graduating into patches of diffused pneumonia. The pneumonia is here, as always, intensely specific, being as much part of the disease as the tubercle, and there is in fact every gradation from tubercles to large patches of tuberculous pneumonia. (Dr. W. Moxon, p 93.)

CROUP AND DIPHTHERIA.—*Tracheotomy in the later Stages.*—Both these diseases may exist in one of two types, the sthenic or asthenic. It is in the sthenic form alone, where the tendency to death is from suffocation rather than exhaustion, that the operation of tracheotomy is admissible. In many of these cases it is possible to prevent immediate death, and so give longer time for the patient to live through the disease, and ultimately throw it off. In the operation the great maxim is operate leisurely and without hurry. (Dr. A. Buchanan, p. 99.)

Glycerine Inhalations in Croup.—Inhalation of pure glycerine in spray,

produced by means of Siegle's apparatus, is being used by some physicians in Mannheim. It is found that the cough becomes free and moist, and the expectoration easy. It is not of much use in advanced cases. (Dr. G. Stehberger, p. 265.)

Irritable Cough of Bronchitis and Phthisis.—*Chloral.*—Chloral exercises a decided control over the irritable cough of bronchitis and phthisis. In many of these cases opium is highly objectionable; conium useful, but uncertain; and hydrocyanic acid next to worthless unless given in dangerous doses. Chloral quickly gives rest, and renders the harassing cough less frequent and harsh. (Dr. R. U. Ronayne, p. 235.)

Pneumonia.—*Carbonate of Ammonia.*—The use of carbonate of ammonia in cases of pneumonitis should not be confined to the later stages of the disease. It should be given from the very commencement in doses of from five to ten grains every two hours, and it will be found that instead of increasing the febrile excitement and heat of surface, both will be greatly reduced in a short time. The pulse becomes less frequent but full and strong, the skin moist, and the temperature reduced. Out of 96 severe cases so treated only two died. (Dr. A. Patton, p. 100.)

Arnica as an Internal Remedy in Acute Pneumonia.—Arnica given internally has a powerful controlling power over the action of the heart and the general circulation. This is particularly seen if administered in cases of surgical fever. In pneumonia, ten minims of the tincture of the British Pharmacopœia every three hours will, in an unmistakable way, control the severity of the symptoms within forty-eight hours. If the remedy is too long continued the pulse will fall to even 40, and in one case it remained at 40 for several days after the medicine had been discontinued, for its effects are very persistent. (Mr. C. C. Balding, p. 97.)

AFFECTIONS OF THE DIGESTIVE SYSTEM.

Abscess in close proximity to the Rectum.—If there is an abscess in close proximity to the rectum it will soon establish a communication both with the gut and the external parts. Instead, therefore, of opening it in the ordinary way by direct puncture through the skin, it is advisable to adopt the plan first recommended by the late Sir B. Brodie, and pass the knife, guided by the finger, into the rectum, cut outwards into the abscess through the sphincter at once, thus making one operation answer instead of two. For this purpose Brodie's knife is the most suitable, it is shaped like a bistoury, but the outside edge is sharp instead of the inside. (Mr. J. C. Forster, p. 137.)

Accidental Swallowing of Artificial Teeth.—If a plate with artificial teeth is swallowed, and it is found impossible to extract it owing to its being so low in the œsophagus, or fixed by the hooks of gold catching in mucous membrane, the best plan is to boldly push it down into the stomach. There are so many instances on record where such ugly bodies have passed through the intestinal tract with safety, that the surgeon is quite justified in resorting to this expedient. (Mr. H. Smith, p. 138.)

Action of Mercury on the Liver.—The author by carefully conducted experiments has determined that mercury has no effect whatever in stimulating the nerves of the orifice of the common bile duct, and so exciting the liver to increased secretion of bile. This supplements the experiments of the Committee of the British Medical Association, and proving that mercury has no action upon the liver either directly or indirectly. (Dr. J. H. Bennett, p. 104.)

Hernia.—*New Operation for the Radical Cure.*—This operation consists in tying together the pillars of the internal ring by salmon-gut ligature. The ligature is cut off short, and becomes deeply imbedded in the minute wound. It does not require removal. The mode of application of the ligature is described. (Dr. A. V. Best, p. 134.)

Invagination of the Sac—a New Mode of Radically curing Hernia.—A case of strangulated femoral hernia is related, in which, after the contents of the sac had been returned, by operation, it occurred to the operator that if the sac were detached from its surroundings and invaginated, and retained in this inverted position, the raw surfaces would form adhesions, the opening be thus plugged up, and a radical cure be effected. This was carried out, and the inverted sac carried well within the cavity of the abdomen by the finger. In doing this, the opening of the crural ring, and the edge of Poupart's ligament could be easily felt by the finger covered with the sac. The external wound was closed and compresses of linen placed over it. A perfect cure resulted. Twelve months after the operation, the report is—"the parts had become quite consolidated, and there was no hernial protrusion." (Mr. S. Wood, p. 135.)

Nasal Polypi.—*The Wire Ecraseur.*—There is no better plan than that of the use of Maw's wire écraseur for nasal polypi. In a case related by the author, at Shanagolden, Ireland, the polypus was so tough, as to actually break a coil of three wires at first used. The loop of wire is to be drawn into the nose by a ligature passed by means of a gum elastic catheter, and for the sake of safety it is as well to pass two ligatures so that in the event of the wire of the écraseur breaking, a second wire can be passed without delay. (Dr. T. Hayes, p. 139.)

Piles.—Transfix the base of the pile (after the patient has extruded it by pressing over hot water) and then, when he is under chloroform, a free incision must be made on the skin side encircling all the tissues to be removed, and the chain of the écraseur passed over the pin, and into the groove so formed. The operation is complete in a few moments, and a small wound is left which rarely bleeds. The bowels should be kept at rest for two days, and then a dose of oil given. (Dr. G. H. B. Macleod, p. 137.)

Toothache.—Let the patient apply one or two grains of acetate of lead to the cavity of the tooth, and then spit out any superfluous amount of the salt; it often gives instantaneous relief. (Dr. H. T. Reynolds, p. 265.)

AFFECTIONS OF THE URINARY ORGANS.

Chronic Retention of Urine.—*Mr. Holt's Winged Catheters.*—In cases of chronic retention of urine, from disease of the bladder, prostate, or urethra, it is absolutely necessary that the bladder should be kept empty, or relieved of its contents when necessary. For this purpose nothing answers like Holt's winged india-rubber catheters. They may be left in the bladder without any inconvenience or distress to the patient, and of course without any tapes or plaster to retain them. It is only necessary to remove them every four or five days to ascertain that no deposit of phosphates is occurring at the end of the bladder. Supposing this is not done, the retained urine produces chronic inflammation of the bladder, and consequent decomposition of the urine, with profuse secretion of mucus and pus. Subsequently disease of the kidneys ensues. A highly polished silver cap at the end of the catheter prevents the accumulation of phosphatic deposit. These caps are being made by Mr. Baker. (Mr. B. Holt, p. 150.)

Sir Henry Thompson's India-rubber Catheter for Retention in the Bladder.—Pass into the catheter a piece of German silver tube four or five inches long, so that the last five or six inches of catheter remains as flexible as ever, also about two inches of the anterior part; then tie round the catheter a stout piece of silk rather more than two inches from the end, which should be furnished with a plug. The silk does not diminish the calibre of the catheter owing to the tube internally, and the tube also renders the *instrument* easier to pass. To fasten the catheter in, it is only necessary to *tie the silk* lightly round the glans penis. (Sir. H. Thompson, p. 153.)

Diabetes.—*Organic Changes of the Brain.*—By following the method of

preparing specimens of nerve structure for microscopic observations, recommended by Dr. Lockhart Clarke, it is found that there are certain definite changes occurring, especially in the medulla oblongata, in cases of diabetes. These changes are in all probability the cause of the disease, or, more correctly, they are the disease, the saccharine urine being only a symptom. These changes originate in alterations in the vessels of the part, and consist of, in succession—dilatation of the minute vessels with extravasation of their contents; degeneration of the nervous matter round the vessels at certain points; and the production of cavities in the situation of previous nerve decay. Similar changes may occur in other parts of the brain, quite independently of diabetes. (Dr. W. H. Dickinson, p. 104.)

Skim-milk Treatment of Diabetes.—The treatment of diabetes by a purely skim-milk diet offers not merely an amelioration of the symptoms, as does that of a meat diet, but gives every probability of an absolute and permanent cure. Two most interesting cases are related illustrative of the mode of treatment; both were bad cases, with urine at high specific gravity, thirst, and hot dry skin; both were permanently cured, not a trace of sugar remaining in the urine, and all the constitutional symptoms gone. The diet is to be six or seven pints of milk from which the cream has been removed, and no other food must be taken, and no stimulants. The sugar totally disappeared from the urine in a fortnight in both cases, still the milk diet was persevered in for five weeks altogether, when part of the milk was given curded with rennet. At the end of seven weeks a meat dinner, with green vegetables, was allowed daily. The last report of each case is at a period of six months in one, and seven in the other, from the commencement of the treatment. The diet was then as follows:—For breakfast: ½ lb. of mutton chop, a pint of milk, and about ½ pint of coffee. For lunch: ½ lb. of potted head or potted meat and a pint of milk. For dinner: about ¾ lb. of roast beef or mutton, chop or steak, fowl or turkey, with green vegetables (brussels sprouts, cabbage, &c.) After dinner, up to bedtime, tea and a liberal quantity of milk are taken. Six pints of milk are consumed daily; from this the greater portion of the cream has been separated. This dietary to be continued for some time longer until it be considered safe to introduce articles of diet containing starch or sugar. (Dr. A. S. Donkin, p. 272.)

Diuretics.—*The Action of.*—Citrate and acetate of potash and spirit of nitric ether slightly increase the amount of water excreted by the kidneys, but decidedly reduce the quantity both of the urea and solids. Oil of juniper, on the other hand, slightly reduces the amount of water, and increases appreciably both the urea and solids. (Dr. F. B. Nunneley, p. 113.)

Incontinence of Urine.—Syrup of iodide of iron, in doses of twenty-five minims after each meal, will generally cure this complaint rapidly. Tincture of iron does not act in this manner. (Dr. J. Barclay, p. 109.)

Chloral.—Fifteen grains of chloral at bedtime, for a child, answers admirably. It should be continued every night until the habit is quite broken. (Dr. W. Thomson, p. 155.)

Nocturnal Incontinence of Urine and Semen.—In many cases both of nocturnal incontinence of semen and of urine there is reason to believe that spasm is an important factor. There is a spasmodic contraction of the detrusor urinæ muscle in nocturnal incontinence of urine. It will be found that fifteen grains of chloral hydrate given every night rapidly cures either of these affections. One dose has been known to permanently cure a case of incontinence of urine, of course, by breaking the habit. Chloral has many advantages over belladonna. The latter frequently takes weeks to produce any marked control over the disease, whereas the action of chloral is immediate, the malady often disappearing after the first dose of the remedy. Moreover, the injurious effect of belladonna upon the eyes is avoided. (Dr. J. B. Bradbury, p. 107.)

Lithotrity.—*To Extract the Detritus by Syphon-suction.*—It is very important to remove as far as possible the detritus produced by crushing the stone, with as *little injury* to the delicate urethral mucous membrane as

possible. The simplest and most effectual method of doing this is by syphon power. This is infinitely preferable to direct suction, as it is quite possible to injure the vesical mucous membrane by the latter. The experiment may easily be made with a tumbler of water containing some sand, and a catheter having a caoutchouc tube attached. It will be found that for the withdrawal of the sand, contact with the eye of the catheter is necessary. For use in lithotrity a catheter should be used, short anteriorly, and having no lateral eye, only a terminal opening which is closed during introduction of the instrument by an obturator, for the purpose of preventing injury to the mucous membrane of the urethra. (Prof. Dittel, p. 147.)

PARALYSIS OF THE BLADDER FROM RETENTION OF URINE.—If after a time the bladder does not regain its power, although the water is drawn off regularly, inject it with a weak solution of tincture of iron. The injection should be allowed to remain half a minute and repeated as necessary. (Mr. C. H. W. Parkinson, p. 112.)

STRICTURE OF THE URETHRA.—There is no plan of treatment of universal applicability. The following are the best principles of guidance. First, that all cases in which it is possible to introduce a bougie, should be treated by gradual dilatation as, in skilful hands, it is the safest, and by far the most effectual, and it is the least liable to be followed by a relapse. Secondly, that strictures which are impermeable to catheters should be treated by internal urethrotomy; and thirdly, that strictures which are impermeable to any catheters or bougies should be treated by external urethrotomy. (Dr. W. Stokes, jun., p. 141.)

Maisonneuve's Method of Performing Internal Urethrotomy.—The first step is to pass a very fine and delicate filiform gum-elastic bougie. Next, a grooved steel director is attached by its point to the end of the bougie, by means of a screw, and passed into the bladder, pushing the bougie before it. The bougie coils up in the bladder. A triangular-shaped urethrotome is then passed along the director, and the stricture divided. The peculiarity of the urethrotome is the chief thing worthy of note in the operation. The projecting angle of the triangular-shaped urethrotome is blunt, so that its contact with the urethra cannot be productive of any wound or injury whatsoever. The part, however, between the angle and the extremity is sharp, but does not wound the normal part of the urethra, as this is borne off by the blunted projecting angle. This cutting edge comes into contact with the stricture and divides it. When the stricture is divided the instruments are withdrawn, and a large-size vulcanized india-rubber catheter introduced. (Dr. W. Stokes, jun., p. 144.)

AMPUTATIONS, DISLOCATIONS, FRACTURES, ETC.

AMPUTATIONS.—*New Method of Uniting Flaps by Deep Suture.*—In amputations the deeper surfaces of the flaps should be brought accurately in apposition by means of carbolised catgut ligatures. A large ligature should be passed just underneath the skin, across one flap from right to left, then introduced into the other flap, and passed from left to right, the ends should then be drawn upon until the flaps are brought into accurate contact, and knotted and cut off short. Of course all the precautions of Lister's system of dressing are used. The external wound is best brought together with a continuous suture of very fine iron wire, made to include the skin only. The knotted end of the deep circular suture is to be completely included and shut out of sight. Before the external suture is quite secured, a syringe is insinuated between the flaps at the spot which remains open, and a jet of carbolised fluid injected to ascertain whether there remains sufficient egress for any fluid that may be poured out from the wounded surfaces. The continuous wire suture will work its own way out, and does not require removal. (Mr. Couper, of the London Hospital, p. 123.)

AMPUTATION AT THE KNEE-JOINT.—The advantages of amputation at *the knee-joint* are very great, but the surgical mechanists object to it, be-

cause the stump is inconveniently long for the subsequent adaptation of a mechanical appliance, the knee joint being thrown lower down in the limb than the natural one, and one thigh consequently appearing longer than the other. This may be obviated by making the femoral section from half to three-quarters of an inch above the antero-superior edge of the condyloid cartilage. This section does not open the medullary canal, and the surface of bone exposed is quite broad enough to bear the weight of the body. In all amputations through the shaft of the femur the weight of the body is supported by the tuberosity of the ischium. (Dr. W. Stokes, jun., p. 114.)

Amputation through the knee-joint offers this great advantage, viz., that the patient can bear the weight of the body without pain on the extremity of the stump. This is on account of the breadth of the surface of bone. Again, there is little or no risk of pyæmia as when the medullary cavities of the shaft of the femur is opened. If there is no disease of the joint the articular surfaces of the femur and patella should not be interfered with. If, however, there is disease of the joint with ulceration of the cartilages, the condyles of the femur should be removed and also the articular surface of the patella or the whole of the bone. (Mr. G. Pollock, p. 117.)

Amputation of the Forearm.—*Modified Circular*—The objection to circular amputation of the forearm are two: first, the difficulty of retracting the soft parts so as to allow the bones being sawn sufficiently high up; second, the deep hollow left for the retention of pus. The objection to the flap operations is the great risk of the bones projecting at the point of union of the flaps, and this is especially the case in the lower portion of the limb, where the shape is so flat. By a simple modification of the circular amputation, the disadvantages of both may be avoided, and the advantages of both secured, by making a longitudinal incision on the lower (ulnar) side, from the free edge of the flap to within an inch or so of the point where the bones are to be divided. By this means constant drainage is secured, and the retraction of the flaps is rendered easy. (Dr. G. H. B. Macleod, p. 118.)

Anchylosis of the Hip-Joint.—*Subcutaneous Division of the Neck of the Femur.*—Previous to the present time only two surgeons (both American) have attempted the relief of anchylosis of the hip-joint by division of the femur. By both, the thigh-bone was divided just below the trochanter major, between it and the trochanter minor, with the object of getting the false joint in the axis of the limb. Neither surgeon operated subcutaneously. Mr. Adams has lately successfully operated in a similar case by subcutaneous division of the neck of the femur within the capsular ligament, dividing the bone near the centre of the neck. A tenotomy knife was first entered a little above the top of the great trochanter, and carried straight down to the neck of the thigh-bone, dividing the capsule freely. A small saw made on purpose was then passed along the track of the knife, and the bone divided from before backwards. It was found necessary to divide some tendons before the leg could be brought straight. The case did perfectly well, and the man was able in the end to bear the whole weight of his body on the limb. (Mr. W. Adams, p. 120.)

Antiseptic System of Treatment in Surgery.—Professor Lister lays great stress upon the necessity of operating in an antiseptic atmosphere. This is accomplished by an assistant playing upon the wound with a carbolic lotion of 1 in 40, by means of a Richardson's ether spray apparatus. The next step after closing the wound is to cover it with oiled silk "protective," dipped in the lotion, to give it a temporary antiseptic film. Instead of covering this with lac-plaster, as hitherto, Mr. Lister now uses oakum, or, what is better still, about eight thicknesses of muslin gauze, dipped in the following mixture whilst melted:—Sixteen parts of paraffin, four parts of resin, and one part of crystallised carbolic acid. The muslin must be pressed or wrung whilst the mixture is hot, to remove the superfluity. In order to prevent the discharge soaking directly through it, a piece of thin guttapercha tissue may be placed beneath the outer layer, to guide the fluid towards the edge of the cloth. (Prof. Lister, p. 124.)

Blood-Poisoning.—*Treatment by a Carbolised Atmosphere.*—In cases of

erysipetalous and pyæmic blood-poisoning, and also as a prophylactic agent after operations, the vapour of carbolic acid, if evolved constantly under and retained by the bed-clothes, is absorbed into the system, as in a vapour-bath or fumigation. By this plan, not only is the system affected, but the wound is kept totally free from putrescence or smell of any kind, when large sloughs are not actually present. This may be carried out best by suspending small muslin bags of Macdougall's disinfecting powder from the ribs of the cradle, which is almost universally used to keep off the weight of the bed-clothes, or to swing the limb in surgical cases. By this means we avoid, on the one hand, the local irritation and the retarding action of the acid upon the granulations of the wound or sore, which we leave free for the application of any other stimulating agent that may be deemed advisable, and for the regular and effective cleansing, which is so powerful an aid to healthy action. (Mr. J. Wood, p. 48.)

Dressing for Wounds.—*Picked Oakum.*—What is wanted is a dressing non-irritating, very absorbent, capable of retaining lotions and of being carbolised, and, for, general, and especially for hospital use, of an inexpensive character and easily obtainable. All these requirements are found in picked oakum. Amputations may advantageously be treated without dressing of any kind, only they must be placed on a protected pillow, first putting under them a double handful of the oakum, which absorbs the secretions, and prevents them running off the mackintosh on to the bed. There is only one objection to its use, and that is its *apparent* roughness, but as patients do not complain of this, it is more an apparent than a real objection. (Dr. T. H. Bartleet, Lancet, May 13, p. 642.)

Excision of the Knee-Joint.—There is a tendency after excision of the knee-joint to have displacement of the femur unless special precautions are taken to prevent it. There may be projection forwards of the lower end of the femur produced by a constant sinking of the buttock in bed; this is best obviated by the use of a hard unyielding mattress. Again, there may be a projection outwards of the lower end of the femur, accompanied with a certain amount of rotation—this proceeds from muscular action, and is best prevented by the use of a very long side splint, extending from the foot to the axilla. If extended to the axilla we may counteract a tendency to an angular twist of the body to the opposite side in bed, whereby the lower end of the thigh is abducted or everted, with an angular projection outwards at the knee. It is well to have the foot piece attached to the side splint in order that all pressure on the heel may be avoided. (Mr. F. J. Gant, Lancet, May 13, p. 640.)

Exhausting Needle-trocar.—*Dr. Protheroe Smith's.*—This is an instrument of great value. It consists of an ordinary glass syringe, having two tubes at its distal extremity at right angles to the body of the syringe, and so arranged as to valves that when the piston is raised fluid is imbibed by one, and when it is depressed it is expelled by the other. Pieces of elastic tubing are placed on both tubes of the syringe—that on the entrance tube being of gum elastic, terminating in the exploring needle. The exploring needles are of various lengths and thicknesses. Two or three should be very long and fine. They are made of steel, gilt. The instrument can be used wherever acupuncture can be employed, for the purpose of diagnosing, evacuating, and treating tumours and effusions of all kinds, whether of joints or cysts containing viscid fluid or otherwise, whether declared by fluctuation or only by the history of the case pointing to this probable issue; in abscess or in abnormal effusion in any of the serous cavities, and in extreme cases of retention of urine, without injury to the bladder. It is also equally efficacious in disengaging excessive collections of flatus, which often prove so distressing in tempanitic distensions of the intestines as to defy all other modes of relief. In the same way, without removing the instrument, remedies can be injected into cysts, abscesses, &c., without any risk of the admission of air. (Dr. P. Smith, p. 129.)

Fractures of the Leg.—*Use of Glue Bandages.*—What is called the glue bandage is made by impregnating a roller with a solution of French glue in

methylated spirit. When applied a sufficient number of times to the limb to make it firm, it is cut up in front, and finally laced through eyelets put into the cut edges. It is very light and elastic, and can be made of any degree of strength. A firmer mould may be made by putting adhesive plaster within and without the glued portion, and a thin layer of cotton wool being put next the leg. (Dr. G. H. B. Macleod, p. 132.)

Simple Fracture of the Leg in Children.—Apply adhesive plaster in a succession of stripes from the foot upwards (of course, after adjustment) and then two light pasteboard splints, retained at their upper and lower ends by a narrow circular band of plaster. (D. G. H. B. Macleod, p. 132.)

AFFECTIONS OF THE SKIN, ETC.

ACUTE GENERAL PSORIASIS.—Depending as this disease does upon active congestion of the skin, no remedies should be employed unless extremely soothing ones. Alkaline baths with subsequent oiling of the skin, combined with cod-liver oil and good living will generally soon cure cases of this kind, in children especially. In many cases tarry applications irritate, and consequently prolong the case. (Dr. T. Fox, p. 177.)

CARBUNCLE.—*To Arrest.*—The first appearance noticcable when a carbuncle is about to form, is a small vesicle containing matter. This is the virus which is the real cause of the subsequent inflammation, and if this virus is destroyed the carbuncle may be nipped in the bud. For this purpose touch the vesicle for a fraction of a second with an incandescent lucifer match, or a red hot wire, from five to seven or eight times in succession, when it assumes a dull whitish appearance from coagulation of the albumen it contains. The pain of the operation is really trifling, and it will save from a week to a fortnight's suffering. (Dr. W. Marcet, p. 195.)

Potassa Fusa.—However it acts, whether by modifying nutrition so that inflammation subsides and the cores are reabsorbed, it is difficult to say, but if a carbuncle be scored crucially with potassa fusa, so as to make a superficial scar, the inflammation does subside rapidly, and without suppuration if it is done sufficiently early. The core is not sloughing cellular tissue, but a fibrinous coagulum, the result of inflammation. (Dr. J. Murray, p. 192.)

ECZEMA.—It is a good plan to combine with the benzoate of zinc ointment a small quantity of spirits of wine, in the proportion of one drachm to the ounce; the spirit softens the ointment and facilitates its application; it produces a feeling of coolness which is agreeable to the heated surface, and it has besides a gentle stimulant effect on the nerves of the skin. The application relieves the heat, the stiffness, and the itching, and the relief continues until the ointment dries up or is accidentally removed. (Mr. E. Wilson, p. 186.)

Eczema in Children.—Firstly, we should cover every visible part of the eruption, whatever its state, and avoiding only the hairy scalp, with the benzoated zinc ointment in combination with spirits of wine; secondly, we should examine carefully into the diet, and direct such a regimen as in our opinion is most likely to be nutritive; and, thirdly, we should administer from one to two minims of Fowler's solution in combination with iron three times a day, after meals. It is well to see that the bowels act regularly. There is no medicine more certain in its effects, more harmless, and more successful than arsenic. The dose for an infant of a month or six weeks old, may be one minim of Fowler's solution, equal to the $\frac{1}{100}$ of a grain of arsenious acid, a dose far too minute to do harm, although capable of doing wonders in the way of good. (Mr. E. Wilson, p. 189.)

The proper Use of Soap in Eczema.—In the early stages of eczema washing the skin is to be avoided, it would irritate and cause disturbance where rest and soothing measures are required. But in the later stages of the disease when the skin becomes thickened and indurated, and the eruption invete-

rate and lethargic, we require some local stimulant or tissue tonic, the first and best of which is undoubtedly soap. A chronic eczema should be thoroughly washed with soap, a certain amount of friction and compression being at the same time used. After the washing it is to be dried with a soft napkin and dressed with zinc ointment, precisely like an acute eczema. The washing should be repeated daily unless we see signs that the irritation produced is excessive. The stimulant treatment causes an exudation on the surface, which relieves the infiltration of the tissues within. (Mr. E. Wilson, p. 188.)

ERYTHEMA OF THE FACE AND ACNE.—In cases of this nature, when acute, and in the early stages, soothing remedies are required. None answers better than a lotion made with half-an-ounce of pale prepared calamine powder, frequently applied after hot bathing, with suitable internal remedies to meet dyspepsia, pyrosis, and uterine troubles. All irritating applications do harm, such as the soap treatment in vogue at Vienna. (Dr. T. Fox., p. 178.)

IN-GROWING TOE-NAIL.—Cut out a triangular portion of the centre of the nail, having a wide base at the free edge of the nail and a fine point at or near the matrix. This will cause the nail to contract from the edges towards the centre, and if kept up for six months will quite alter the shape of the nail, making it filbert-shaped, and prominent in the centre. The edges of the nail should be raised and separated from the soft parts into which they intrude with a piece of worsted coated with mercurial ointment. When exquisitely sensitive granulations exist some extract of belladonna and resin ointment rubbed together forms a good application. (Dr. J. Waring-Curran, p. 131.)

LICHEN RUBER.—This is a very rare disease in England. It does however occur. It is characterised essentially by the development of solid *red papules*, caused by effusion of lymph about the hair follicles. It is dependent upon disorder of the sympathetic nervous system. It is very easy to aggravate the congestion. Too hot a bath will do it, the heat of the bed, warm drinks, a cold wind; even arsenic, which is said to be *the* remedy for the disease will not unfrequently act in the same way. The most soothing remedies are required. (Dr. T. Fox, p. 178.)

SKIN-GRAFTING.—The process of skin-grafting does not consist in a transplantation of a portion of real skin, it is only cuticle, and, consequently, the growth which results is merely a cicatrix, in every respect indentical with that formed spontaneously in the natural process of cure. (Mr. D. Page, p. 185.)

It is most essential to success that the granulating surface is in a healthy condition. A good guide is the tendency to form marginal cicatrisation. Not only will the minutest portions of skin answer the purpose, but larger pieces, probably even as large as a penny, may with success be transplanted. Transplanted skin does not retain its perfect integrity and function as does skin employed in Talicotian operations, since we cut it so close to its under surface, in order to avoid fat and areolar tissue, that we cut through most, if not all, the sweat glands and hair bulbs. If the granulations are not quite bright and active, they should be scratched or slightly incised, and the graft laid on when the bleeding has stopped. It may be bound in its place by a strip of Lister's lac plaster, or a piece of gutta-percha tissue covered by strapping. A compress of cotton-wool should be placed over the strapping, and over all a bandage rather firmly applied. The advantage of the gutta-percha is that, being transparent, it enables us to see, while stretching it across, that the grafts do not slip. (Mr. C. Steel, p. 182.)

Skin-Grafting for the Cure of Ulcer on the Leg.—The case of a man who had had an ulcer on the leg for twenty years is related, which had resisted all means of cure. Three pieces of skin, the size of a pea, were removed from the forearm, and placed on the surface of the wound. Some pains had previously been taken to get the surface of the sore as healthy as possible. These were bound to the granulating surface with ordinary soap plaster.

In three days the plaster was removed, and the morsels of skin no longer looked white, but were of a reddish blue colour, and elevated in the centre. No further change took place for seven or eight days, when they rapidly commenced to increase in circumference. The ulcer was completely cured. It is better to employ a dressing forceps and bistoury in taking the grafts, instead of the scissors. (Mr. R. W. Goldie, p. 185.)

VENEREAL AFFECTIONS.

CHORDEE.—The most effectual remedies for chordee are a fifth of a grain of morphia injected under the skin at bedtime, or a suppository of one-third of a grain of morphia and two grains of extract of belladonna. (Dr. B. Hill, Lancet, April 29, p. 570.)

GONORRHŒA.—Arrest of gonorrhœa must not be attempted after the discharge has begun, but, before that period, that is in the very earliest stage, the disease may often be arrested by the injection, every hour or two hours, of half or quarter of a grain of nitrate of silver, or half-a-grain of sulphate of zinc or tannin, to the ounce of water. (Mr. B. Hill, Lancet, April 29, p. 570.)

Permanganate of Potash Injections.—Permanganate of potash, of the strength of five grains to the ounce of water, is a valuable injection in cases of gonorrhœa and gleet. The strength may be increased up to fifteen grains. It should be used four times a day. As the permanganate loses its virtue by admixture with any extraneous matter, or exposure, it is advisable to mix the injection immediately before using it. (Dr. T. Warden, p. 197.)

Injections of permanganate of potash, five grains to the ounce, are of great service in the treatment of gonorrhœa, both acute and chronic. This plan of treatment is not, however, so suitable for cases of extremely chronic gleet as the tincture of iron internally. Out of sixteen cases of acute gonorrhœa, ten were cured in six days on an average. (Dr. W. M. Campbell, p. 196.)

Tannin and Glycerine.—Tannin mixed with glycerine forms a waxy mass, which soon becomes smooth, hard, and brown, but readily dissolves under a gentle heat. Rods suitable for introduction into the urethra can be made of tannic acid 2 parts, powdered opium 0·12 parts, and a sufficiency of glycerine. A piece about an inch and a-half long is left in the urethra, where it melts sufficiently to be expelled by the urine in five or ten minutes. The remedy is to be applied twice or thrice daily. (Dr. Schuster, p. 195.)

To Cure Gonorrhœa in One Week.—Give no internal medicine whatever, and direct an injection of two grains of sulphate of zinc to the ounce of water, to be used at least four times a day, and much oftener if there is the opportunity to do so. The injection should be continued at least a week after the discharge has entirely ceased, and it should not be left off suddenly, but gradually. (Dr. P. Foster, Lancet, May 13, p. 666.)

SYPHILIS.—*Subcutaneous Injections of Corrosive Sublimate and Common Salt.*—Corrosive sublimate and common salt combine chemically, and form a soluble compound which does not precipitate albumen. Two parts of sublimate, and from 20 to 26 of salt, to 1000 of water, form a suitable solution, which cause no heat or pain, and the use of which is not followed by the formation of abscesses. Syphilitic ulcers heal rapidy under the tropical application of this solution:—200 parts of water, 1 part of sublimate, and 10 of common salt. (Dr. Stern, Lancet, May 6, p. 617.)

AFFECTIONS OF THE EYE AND EAR.

CATARACT EXTRACTION.—*After-Treatment of.*—After the operation, the eyelids should be closed with a couple of strips of court-plaster, about an

inch and a half long and a quarter of an inch wide. Bandages and compresses of all kinds are injurious. They are hurtful in proportion to their action. Moreover, they produce heat of the eye, and soak up the secretions, which ought to have free vent. The practice of opening the eye a few days after the operation cannot be too strongly deprecated. The examination is useless if the eye is doing well, and if otherwise, it is certain to aggravate the evil. The state of the eyelid is an excellent guide to the state of the corneal wound. A red puffy lid shows an inflammatory state of the eyeball, and want of repair in the wound. After seven days, success is pretty certain, if no unfavorable symptoms have occurred, and the plasters may be removed after they have been thoroughly softened with warm water. (Mr. H. Walton, p. 271.)

Removal of Soft Cataract by Absorption.—It should be our great principle, in procuring absorption of a soft cataract by admission of the aqueous humour, to avoid all movement of the lens from its natural position. If much force is used in puncturing its capsule, or if the laceration is made too free, the lens is liable to become dislocated, causing chronic mischief in the eye and even disorganisation. It must be remembered that swelling of the cataract always ensues upon admission of the aqueous humour to it, and that thereby the tear in the capsule is often considerably enlarged. It is, therefore, well not to open the capsule too freely. It is preferable to introduce the needle through the cornea rather than through the sclerotic. (Mr. H. Walton, p. 172.)

Lamellar Cataract.—It is very important in a practical point of view to recognise this form of cataract, as it is often best treated by the formation of an artificial pupil without any other operation. It is a central opacity of the lens surrounded by a zone of lens substance, either quite transparent or here and there studded with small opacities. It depends of course upon the widtl and transparency of this zone whether an artificial pupil will suffice for relief. The cataract consists of a layer of opaque lens substance lying between the transparent nucleus and a clear portion of the cortical substance. (Mr. J. S. Wells, Lancet, April 15, p. 497.)

Glaucoma.—In excising a portion of iris for the relief of the tension of glaucoma, it is essential to success that the iris should be carefully and completely removed from the wound, for any inclusion of it in the cicatrix will certainly increase the secretory irritability of the eye. The operator should himself use the scissors for removal of the portion of iris, as, feeling at the same time the tension, he can apply the convexity of the scissors far more accurately to the edges of the wound than can the assistant. (Von Gräefe, p. 171.)

Hysterical Ptosis.—There is nothing like a smart galvanic shock for curing hysterical paralysis. A girl was brought to the Birmingham Eye Hospital who could not open her right eye. When, however, her attention was withdrawn from it by a pretended examination of the left eye, and the right eye was during the examination opened, it remained open until she recollected and closed it. A strong shock passed from one canthus to the other cured it. This is a parallel case to the more common one of hysterical aphonia, which is curable by electricity directly applied to the vocal cords by Dr. Morrell Mackenzie's apparatus. (Mr. F. H. Hodges, p. 172.)

Oblique Illumination of the Eye.—Oblique illumination of the eye is of great use in ascertaining the condition of the crystalline lens, and even the anterior part of the vitreous humour. The light from a good lamp, placed at one side of the patient and a little in front of him, is to be concentrated upon the eye by means of a strong convex lens of two or three inches focus. Any opacity of the lens or vitreous is at once detected, appearing white upon a black ground. A second lens may be employed as a magnifying glass. (Mr. J. S. Wells, p. 163.)

Obstruction in the Eustachian Tube.—These cases, which generally *arise from* catarrh, are often curable by the following method, known as *Politzer's*. Place the tube of an india-rubber force pump within one of

the nostrils of the patient, and then close the other by pressure with a nasal pad. The patient then swallows by degrees, a small quantity of water previously taken into the mouth, and the Surgeon at each successive act of deglutition, compresses the air bag held in his own right hand. Air is forced each time up the Eustachian tube, overcoming at once any moderate degree of obstruction. (Dr. P. Allen, p. 176.)

Otorrhœa.—*Carbolic Acid.*—The use of the following lotion is productive of almost uniformly good results in chronic otorrhœa. Carbolic acid, one drachm; glycerine, one ounce; distilled water, five ounces. (Mr. J. P. Pennefather, p. 175.)

MIDWIFERY, ETC.

Chloral in Labour.—In a case where the pains are pretty strong, but progress is arrested owing to rigidity of the soft parts, give twelve-grain doses of chloral every hour. The sufferings of the patient are to some extent relieved, and at the same time relaxation of the parts is produced. (Dr. J. C. Du Hamel, p. 237.)

Chronic Perforating Ulcer of the Bladder.—*Formation of an Artificial Vesico-vaginal Fistula.*—In this disease, the pathology of which is described by Rokitansky as a limited perforating ulcer, the pain on distension of the bladder with urine is very great. It is relieved by micturition, but returns again directly the bladder commences to refill. The patient becomes in time completely worn out with suffering. The only plan of successful treatment is to establish an artificial vesico-vaginal fistula so as to give the bladder complete rest. This is done by passing a grooved staff along the urethra and slitting up the posterior fourth of the canal, and about an inch of the posterior wall of the bladder. There is no difficulty in getting the fistula to a close after the ulcer has healed; the difficulty is to get it to remain open long enough. (Mr. L. Tait, Sir J. Y. Simpson, p. 224.)

Diphtheritic Poison.—*Absorption of, per Vaginam.*—An outbreak of diphtheria recently occurred in the obstetric wards of Guy's Hospital. In the first case which occurred there was a large diphtheritic patch between the right thigh and swollen labium. In all the other cases which occurred there had been some slight operative interference; for instance, in one a fragile calculus was removed from the urethra, and in a few days the parts which had been abraded were covered by a diphtheritic layer running up to the bladder. Such a case appears to prove that the poison may enter the system by an abraded surface, and when this is the case it usually acts very rapidly. (Dr. J. B. Hicks, p. 101.)

Dysmenorrhœa.—*Mechanical.*—It is often very difficult to introduce a sea-tangle tent owing to the axis of the cervical canal not being that of the instrument as it is held by the operator. To obviate this, Mr. Godson, of St. Bartholomew's Hospital, uses a tent holder having a ball-and-socket joint near the extremity, which enables the tent to move in any direction and find its way without violence through the canal of the cervix. (Mr. Godson, Lancet, April 22, p. 535.)

Fibrous Tumour of Uterus.—*To Arrest Hemorrhage from.*—Having by means of an ordinary sound ascertained the length and direction of the uterus, pass a hollow one into the organ. A syringe composed of vulcanite containing about a drachm of the liq. ferri perchloridi, is fitted closely into the orifice at the proximal end of the probe, and its contents are gently thrown into the womb. No pain is generally felt as a result of this injection, but a feeling of burning is sometimes complained of. This simple procedure will in most cases arrest the hemorrhage from uterine fibrous tumour. (Dr. J. M. Duncan, p. 206.)

Forceps.—*Use of the Long Forceps Early in Labour.*—General practitioners delay much too long before applying the forceps, and especially the long instrument. A more early use of the forceps when the head is above the brim would probably save many lives. (Dr. F. H. Daly, p. 200.)

OVARIOTOMY.—*Mode of Securing the Pedicle.*—The clamp ordinarily used for securing the pedicle by its shape and form hides from view the part of the wound immediately beneath it, and it is difficult to dress it and keep it clean and dry. The escape of the pedicle altogether is also liable to occur. To remove those objections Mr. Grailly Hewitt has invented an instrument, consisting of a framework of steel something like a shoe-buckle in shape, two and a half inches long by three-quarters of an inch wide. Three small holes or buttons project on each of the long sides and one on each of the ends. These buttons are all projecting from the same surface of the framework and at right angles to it. The pedicle is perforated by a needle armed with a double strong thread in two or three places, according to its size, and is then tied in segments. The frame is then placed round the end of the pedicle and the ends of the threads secured firmly to the buttons. By this plan the cut end of the pedicle is freely open for inspection and treatment. (Dr. G. Hewitt, p. 207.)

An Improved Method of Dividing the Pedicle.—None of the methods of dividing the pedicle in cases of ovariotomy quite answer the ends desired. They either do not completely arrest the hemorrhage, prevent union of the external wound, or there is returned into the abdomen a small portion of devitalised tissue. By firmly seizing the pedicle with one pair of forceps, and twisting the distal end of it by a second pair of forceps, the pedicle may be twisted off close to the edge of the instrument by which it is held. It is necessary that the torsion should be very slowly performed. The forceps to be employed are made expressly for this purpose. Their construction will be understood at once on reference to the woodcut at p. 210. The arrest of hemorrhage by this plan is most effectual. (Dr. G. H. B. Macleod, p. 209.)

PREGNANCY.—*To Calculate the Day of Confinement.*—The average duration of pregnancy is 278 days, rather shorter than has been generally taught. To calculate the time of delivery the plan is simply as follows: Find the day on which the female ceased to menstruate, or the first day of being what she calls well. Take that day nine months forwards as 275 days, unless February is included, in which case it is taken as 273 days. To this add three days in the former case, or five if February is in the count, to make up the 278. There are, however, so many irregularities that the date arrived at only gives the week during which the confinement will probably take place. (Dr. J. M. Duncan, p. 198.)

PROCIDENTIA UTERI.—*Influence of the Perineum.*—The perineum has no direct effect in maintaining the uterus *in situ*, consequently relaxation or rupture of the perineum does not by any means involve procidentia. In the majority of cases the perineum is either entire or not more injured than it is in the great mass of women who have borne a child. There can, however, be no doubt that laceration or relaxation of the perineum favours the occurrence of procidentia in cases where the causes of this accident are in operation. In the treatment of the disease it is a great mistake to suppose that a perineum, however renewed, removes any cause of its occurrence. The restored perineum may or may not succeed in resisting the progress of the descending uterus. It can only cure when its rigidity is sufficient to effectually oppose the progress of the uterus trying to force its way over it. (Dr. J. M. Duncan, p. 220.)

PUERPERAL CONVULSIONS.—*Chloroform.*—In cases of puerperal convulsions either before or after delivery, we have an agent in chloroform by which we can control the disease almost at pleasure. With this at command it appears doubtful whether it is advisable in the first stage of labour to resort to any mechanical means for dilating the neck of the womb, notwithstanding the perfection with which that proceeding can be accomplished. The success attending the continuous administration of chloroform is really wonderful, providing that in severe cases it is given sufficiently long and perseveringly. In mild cases it is sufficient to keep the patient very slightly under its influence in the intervals of the fits, more being given when indications of an attack are seen. If the convulsions have already produced much pulmonary congestion it is beneficial to withdraw a few

ounces of blood before administering chloroform, and generally it is advisable to lessen the tendency to cerebral congestion by the application of cold to the head. (Dr. J. J. Phillips, p. 203.)

MISCELLANEA.

ANÆSTHETICS.—*Nitrous Oxide Gas.*—Anæsthesia from the inhalation of nitrous oxide gas is usually procured in one minute and twenty seconds. In thirty seconds the colour of the skin turns slightly livid, and in sixty seconds the pulse falls in force and frequency, and breathing becoming often laboured and sometimes stertorous. A nervous twitching of the hands is often the most prominent mark of complete anæsthesia. There is never any of the struggling so common during the excited stage of chloroform. Recovery is usually rapid and complete, the patient waking up as if from sleep. The longest period during which the anæsthesia lasts is one minute, but, by alternating it with air, insensibility has been kept up for as long as twenty minutes. Dr. Richardson considers that it acts simply by producing asphyxia, and is, therefore, a most dangerous anæsthesia. It appears likely, however, to supersede chloroform in all operations not lasting over one minute, its advantages being—1, Its safety; 2, The absence of troublesome after-effects; 3, The rapidity of its administration: 4, The sitting position is the most suitable for its administration; 5, The absence of anything unpleasant in its taste and smell. The only fatal case which has occurred fairly from its administration was one of phthisis, so that the existence of that disease should be accepted as a contra-indication of its use. (Dr. Maclaren, p. 237.)

Chloromethyl (*Bichloride of Methylene*).—Chloromethyl is superior to chloroform as an anæsthetic in surgery. Mr. Spencer Wells has now employed it in 180 cases of ovariotomy, in some 25 other cases of gastrotomy, and in more than 50 operations of more or less severity, such as herniotomy and removal of tumours. In not one of these cases did any unpleasant symptoms occur, although the anæsthesia was in some very prolonged, as much as forty-five minutes to an hour or more. He says, "I have never been at all uneasy in any one of these cases, more than 250 in number, either during the administration of the anæsthetic, or from any subsequent ill effects fairly attributable to it. Whereas, with chloroform, I never felt quite at ease." There is much less tendency to sickness after the use of chloromethyl than after that of chloroform. (Mr. T. S. Wells, p. 243.)

Mode of Administering Chloroform.—The following is the mode of administering chloroform in use at St. Bartholomew's Hospital. A bit of lint is laid lightly over the patient's face, and the chloroform dropped upon it from a graduated bottle, the stopper of which is perforated and drawn out to a fine point. Every now and then the lint is reversed as more chloroform is dropped out. (Mr. Bloxam, p. 257.)

Carbolic Acid as a Local Anæsthetic.—Carbolic acid possesses wonderful powers as a local anæsthetic. If a portion of skin is covered with a cloth soaked in a saturated solution of carbolic acid for half an hour, and then a streak traced across the surface with a camel's-hair brush dipped in acid liquefied by one-twentieth its bulk of water, the skin may be divided along the course of the streak with a sharp scalpel, quite down to the subcutaneous cellular tissue, without causing any pain. Abscesses, whitlows, and buboes may be opened with great advantage in this manner. Sometimes it is necessary, when making an incision through the integument, to brush out the wound made with some liquefied acid before making the incision deeper. (Dr. J. H. Bill, p. 128.)

Oil of Peppermint as a Local Anæsthetic.—Oil of peppermint lightly applied to the seat of pain, with a camel's-hair pencil, will often give instantaneous relief in cases of facial neuralgia. It is so used by the natives of China. (Dr. A. Wright, p. 258.)

ARSENIC.—*Therapeutic Action of.*—The action of arsenic is twofold: 1st, Upon the blood; 2nd, Upon the skin. Its action upon the blood arises from its property of direct combination with the blood globules. This combination is made at the expense of the oxygen, of which arsenic takes the place. This change in the globules lessens the tissue changes, or the denutrition of the body. This action is evidenced by the diminution in the amount of urea secreted, and by reduction of the temperature of the body. Its action upon the skin is caused by its powers of producing injection of the superficial capillaries, whereby increased nutrition of the epithelial surface takes place, with a rapid growth of epithelium. All the three symptoms—the silvery tongue, the plump appearance of the face, and the red conjunctiva—are indications of this action, and are explained by it. (Dr. J. Cleland, p. 180.)

CHLORAL.—*What Quantity of Chloral Hydrate can be given with safety, in divided doses, during a stated period, say of twenty-four hours?*—The body cannot decompose and throw off the hydrate more rapidly than at the rate of from five to seven grains per hour. Although there must be variations according to age and other circumstances, they are not such as to alter materially the rate of action from the estimate given. One hundred and twenty grains, administered in divided doses, in twenty-four hours, is the safe limit of administration. (Dr. B. W. Richardson, p. 228.)

There is no doubt that what is considered a moderate dose of chloral, thirty grains, is too large a dose to commence with, especially for a patient in whom the effects of the chloral have not been previously tried. Ten or fifteen grains will often answer the purpose perfectly well. (Dr. H. W. Fuller, p. 230.)

The Vehicle for Chloral.—The effect of chloral is modified by the vehicle in which it is administered. If given in syrup it is absorbed slowly, and its effects are more prolonged. This is consequently the best form of vehicle when it is wished to procure a night's sleep. If given in a thinner vehicle, as camphor water or simple water, it shows its effects far more rapidly, and they pass off in a shorter time. So rapidly may chloral be absorbed and decomposed in the blood, that the chloroform is let free with too great rapidity for safety. (Mr. H. F. Smith, p. 231.)

EMBALMING THE DEAD.—Dr. Vivodtsef, a Russian Physician, has invented a method of embalming the dead by means of carbolic acid. It is cheap, easy of execution, and effectual. An alcoholic solution of carbolic acid is injected by means of a suitable apparatus into the principle arteries, so that the whole body becomes thoroughly saturated with the acid. The apparatus (of which an engraving is given) and mode of procedure will be found fully described. (Dr. Vivodtsef, Dr. G. L. Carrick, p. 266.)

GLYCEROLE OF STARCH.—This useful preparation is made by rubbing well together one part of starch in eight of glycerine; the mixture being then gradually heated to 240° Fahr., and constantly stirred till a translucent jelly is formed. As a local remedy in many acute affections of the skin, and to prevent the pitting of small-pox, it deserves a more extensive trial. It is a capital substitute for lard in making ointment. (Dr. H. S. Purdon, p. 260.

HÆMOSTATIC COTTON WOOL.—Soak the cotton for an hour in a solution containing 4 per cent. of soda, then wash and dry. Dip it one, two, or three times in a dilute solution of perchloride of iron, dry, and pull apart by the fingers. It is hygroscopic, and an excellent dressing for wounds. (Dr. Ehrle, p. 133.)

HYPODERMIC INJECTION OF MORPHIA.—When morphia comes to be used hypodermically as a habit, and in large doses, it generally arises from a non-appreciation of the difference between a stimulant and a narcotic dose. There *are* cases, but they are exceptional, in which we are obliged to permit the use of narcotic doses, such as in malignant tumours. A stimulant dose of morphia is that dose which relieves pain but stops short of narcotism. *This is from* $\frac{1}{12}$ to $\frac{1}{4}$ grain, and will procure all we want in nearly every case. *Narcosis is* a depression of nervous life. The first effect of narcotic doses *is slight* and "functional" depression, but this depression becomes perma-

nent if the morphia is continued in narcotic doses. A stimulant dose produces neither stupor, contracted pupil, or subsequent constipation of bowels or burning of tongue; a narcotic dose produces all these. (Dr. F. E. Anstie, p. 244.)

INFECTION.—*Ready Method of Preventing.*—There is perhaps no plan of preventing infection so ready as the production of sulphurous acid by the combustion of sulphur. To disinfect a bed, whilst the patient is temporarily removed from it, pass a copper warming pan into the bed, containing a few live embers and a little sulphur. The pan should be moved about during the ignition of the sulphur. By burning sulphur in an open vessel, closets, carriages, passages, and vacated chambers of the sick may be easily disinfected. Clothing may be lightly sponged over or sprinkled with water containing a little well-mingled sulphur, and then ironed with a flat iron heated to a temperature which will cause volatilisation of the sulphur without burning the linen. (Mr. J. Startin, p. 265.)

KALI-KUTKI.—*A new Tonic.*—Kali-kutki root is well known in the Indian market. It is very light and brittle, brownish-white in colour externally, and deep black internally, with short waxy fracture. It is an excellent tonic, equal to gentian and calumba. (Mr. M. C. Cooke, p. 262.)

LEECHES.—*How to Apply.*—Always before applying leeches apply a mustard plaster to the part. The leeches will bite with the greatest avidity, and the flow of blood is far more copious than would be thought likely or possible. So much so is this the case that caution is required, only two or three being applied instead of half a dozen. If bread poultices are applied afterwards the blood flows as if it would never stop. (p. 265.)

SOLUTION OF SANTONINE.—The insolubility of santonine impairs its utility. The only fluid which will dissolve any appreciable quantity is a hot solution of carbonate of soda. It is prepared as follows: Santonine, in powder, 12 grains; carbonate of soda, 20 grains; distilled water, 3 ounces. Put the soda and water into a flask, keep the fluid near the boiling-point, adding, as it disappears, about two grains of the santonine at a time, until the whole is dissolved. Solution is effected in about half an hour, during which time the water is reduced to ℥ ij. If so reduced, ℥ j will contain a full dose—six grains of santonine. If an alkaline reaction be objectionable, neutralize with acetic acid. Both solutions, the alkaline and the neutral, are bright, clear, and permanent. These solutions may be used topically, as in parasitic disease of the bladder. (Dr. J. Harley, p. 260.)

STRYCHNIA POISONING.—*Bromide of Potassium.*—Bromide of potassium, in doses of rather more than a drachm every half hour, is a most effectual remedy in cases of poisoning by strychnia. The physiological effects of strychnia and bromides upon the anterior columns of the spinal cord are directly antagonistic. (Dr. C. B. Gillespie, p. 256.)

SUSPENDED ANIMATION.—*Bain's and Pacini's Methods of Restoring Suspended Animation.*—In Bain's method the patient is laid upon his back on a table, and the operator standing at the head pulls the shoulders horizontally towards him with a certain degree of power, placing for this purpose the fingers of each hand in the axilla, in their front aspect with the thumbs on the clavicles. In Pacini's method the patient and operator are in the same relative position, but the operator takes hold of the arms of the patient behind, and close to the armpit, while the thumb is in front of the head of the humerus. He then pulls both shoulders towards him, and lifts them in a perpendicular direction, by which means the sternum is first raised by means of the clavicle, and, in consequence, the ribs, which, diminishing their obliquity to the spine, enlarge the thoracic cavity both in its transverse and antero-posterior diameters. A Committee of the Medico-Chirurgical Society report that by either plan, as also by Dr. Silvester's, of which they are merely modifications, a sufficiently large quantity of air is without difficulty introduced into the chest. (p. 247.)

WATER.—*To Clear Muddy Water.*—Seventy grains of chloride of calcium added to each gallon of muddy water will effect clarification in a moment. Other salts of lime, such as the nitrate and bicarbonate, and caustic lime, *effect the same object.* (Dr. C. Schlœsing, p. 262.)

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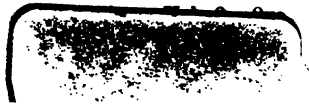

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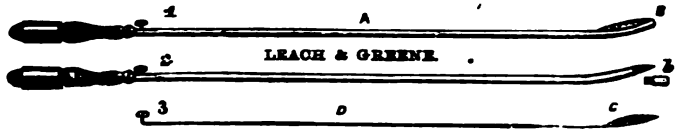

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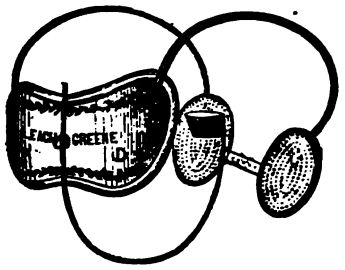

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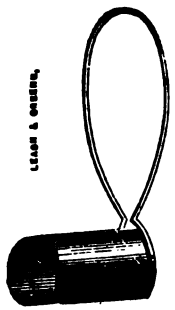

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Fig. 2.

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FIG. 1

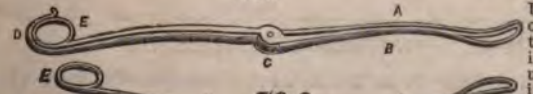
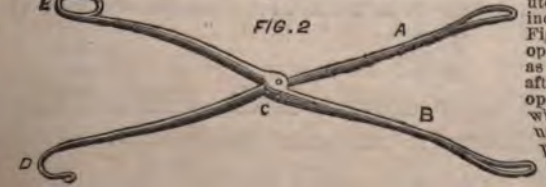


FIG. 2



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New York, July, 1871.

To whom it may concern:

The publication of "The Physician's Monitor" was commenced early last year The issue for this year has been delayed to enable the undersigned to obtain the valuable "Report of the proceedings of the American Medical Association" for 1871. It will include also the "Amended Constitution" of the American Pharmaceutical Association for this year, together with other valuable matter of permanent interest. The first number contained "Code of Ethics of the American Association," "A List of Poisons with their remedial Agents," with other choice and useful matter. Its purpose is to glean every kind of practical information for Physicians and Druggists. It is conducted by a Gentleman of superior attainments, who aims to make its leading characteristic a ready reference, always at *hand*. The "Monitor" is published annually, at twenty-five cents, *post-paid*. It contains thirty-two octavo pages, chiefly reading matter, to *face* a corresponding number devoted to advertisements obtaining for them *special* attention. The plan he has adopted to secure an immediate popular patronage is expensive, (costing fully five Thousand Dollars,) but *certain*. He agrees to circulate *gratuitously* Fifty Thousand of each number to distinct addresses, prepaid directly to Physicians and Druggists This list of names has been obtained with great care and expense by personal communication, and is *reliable*. It is believed that Two Hundred and Fifty Thousand interested persons will have consulted its pages during the year

The undersigned, favorably known in connection with the publishing and bookselling business for the past thirty years, gives his personal attention to the advertising department. He has long made the subject a study, and claims to have mastered it. For a third of a century "Braithwaite's Retrospect" has been published by him, and has acquired a permanent patronage of over ten thousand subscribers. The well known reputation of this celebrated epitome of Medical Science obviates the necessity of any description of its merits. It has long enjoyed the proud distinction of being the most popular periodical of its kind in the world, having a circulation more than *three* times that of any similar publication. It is issued in January and July, and mailed directly throughout every section of the country. As auxiliaries to disseminate information to the Medical Profession and to those engaged in Pharmacy, these mediums possess superior inducements and facilities to advertise Medical Colleges and Schools, Late Works, Surgical Appliances and Instruments, and all kindred pursuits. As an investment in business puffs as well as *judicious* advertising, the undersigned invites all interested to the following rates, and challenges the production of more moderate terms for so large a *guaranteed* circulation.—

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